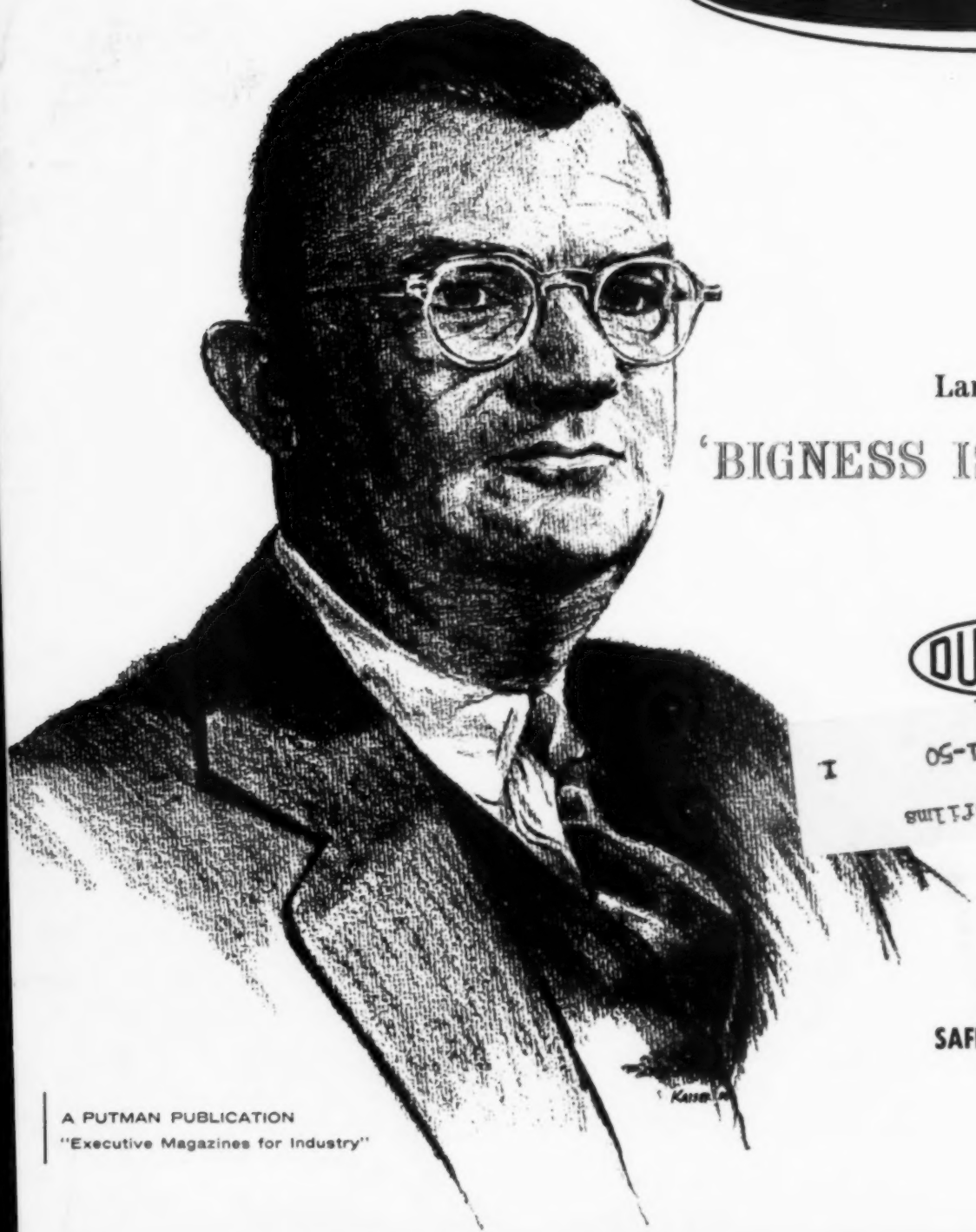
MAY 1958

UP TO THE MINUTE
Power services and operational developments — 14 pages start on page 22

POWER INDUSTRY



Lammot du Pont Copeland...

'BIGNESS IS NECESSARY'

...page 16

DU PONT

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STRETCHING COAL DOLLARS — page 11

SAFETY — WHOSE RESPONSIBILITY? — page 13

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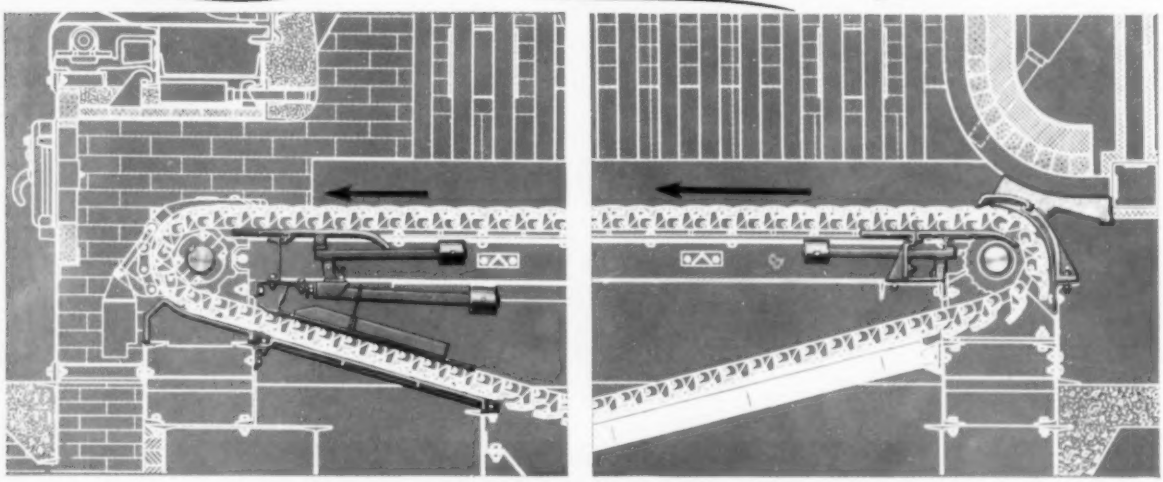
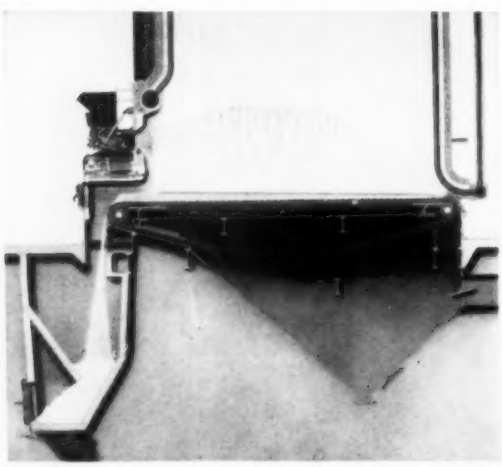
DOWN WITH EXCESS AIR!



Floating Front and Rear Grate Seals—A Detroit RotoGrate Exclusive.
They decrease excess air.

Automatic Air Seals Exclusive With Detroit RotoGrate Stokers Reduce Excess Air to 22% and Lower



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Circle 1743 opposite last page

May 1-8: ASTE Tool Show and Convention; Convention Center, Philadelphia.

May 4-7: Air Conditioning and Refrigeration Institute Annual Meeting; The Homestead, Hot Springs, Va.

May 5-7: American Mining Congress Coal Convention; Netherland Hilton Hotel, Cincinnati.

May 5-7: Purdue Industrial Waste Conference; Memorial Union Building, Purdue University, Lafayette, Ind.

May 7-11: Western Air Conditioning Industries Assn. Conference and Exhibit; Shrine Exposition Hall, Los Angeles.

May 8-9: Cost Reduction Conference; Illinois Institute of Technology, Metallurgical and Chemical Engineering Bldg., Chicago.

May 12-14: American Management Association Management Conference; Commodore Hotel, New York City.

May 14-16: Pacific Coast Electrical Assn. Convention; Hotel Del Coronado, Coronado, Calif.

May 18-21: Industrial Heating Equipment Assn. Meeting; The Homestead, Hot Springs, Va.

May 19-23: AWS Show; Hotel Schroeder, Milwaukee.

May 19-23: National Fire Protection Assn. Annual Meeting; Palmer House, Chicago.

May 21-23: Industrial Supervision Institute Management Conference; Purdue University, Lafayette, Ind.

May 25-29: Air Pollution Control Assn. Meeting; Sheraton Hotel, Philadelphia.

June 7-Aug. 15: Institute of Gas Technology Summer Session; Illinois Institute of Technology, Chicago.

June 9-12: ASME Conference on Materials Handling; Public Auditorium, Cleveland.

June 9-13: Automation Exposition and Congress; Coliseum, New York City.

June 11-14: Congress of Theoretical and Applied Mechanics; Brown University, Providence, R. I.

June 15-19: ASME Semiannual Meeting; Statler Hotel, Detroit. ◆

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Advertising Representation is listed on page 37

SUBSCRIPTIONS

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NBP NATIONAL BUSINESS PUBLICATIONS, INC.

MAY 1958

May 1958

VOL. 74 No. 5

POWER INDUSTRY

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PUTMAN PUBLISHING COMPANY • 111 EAST DELAWARE PLACE • CHICAGO 11, ILLINOIS

IN THIS ISSUE

11 **Stretch Coal Dollars**

RCA's Manager of Power Services, John S. Cole, explains the fuel evaluation scheme he used to clip annual fuel bills by a hefty $30,000.

13 **Who is responsible for safety?**

Nobody is anti-safety, but people are often vague on their direct safety responsibilities in the company structure. William Rogers, Safety Director for Ebasco, draws on his experience to set responsibilities straight.

16 **Is Big Business Necessary?**

Lammot du Pont Copeland of Du Pont tackles the problem of "Big Bad Business." Some of his facts and figures may surprise you.

22 **New Developments**

A roundup of the current and choice in developments, new ideas in plant services, available literature and other on-the-job help.

MONTHLY FEATURES

2 Conventions & Exhibits
4 Reports in Brief
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9 Spotlight on People
10 Spotlight on Growth
22 New Developments
30 New Literature
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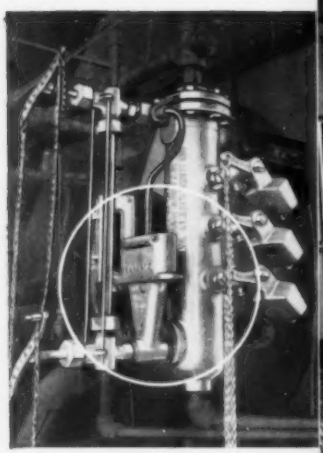
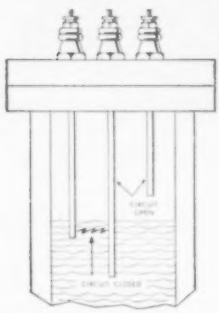
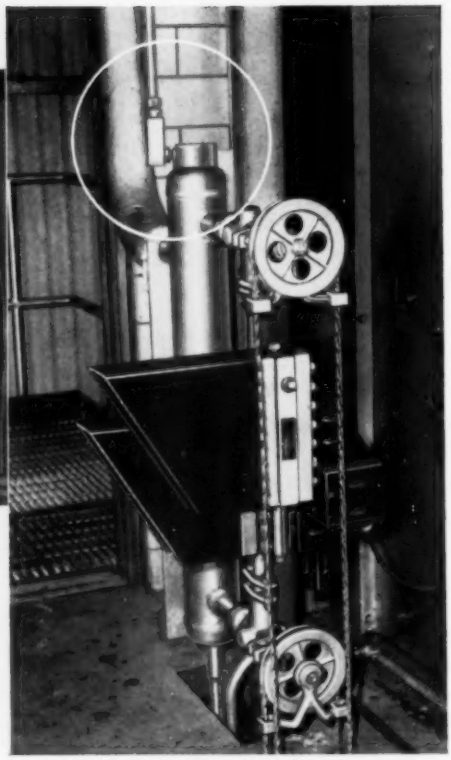


Simplest type of Levalarm, the EA15, for fuel cut-out or/and low water alarm.





The EA18 Levalarm on this water column provides high and low alarm, fuel cut-out, pump start and pump stop.

Your boiler water "calls the signals" through the Reliance LEVALARM® system

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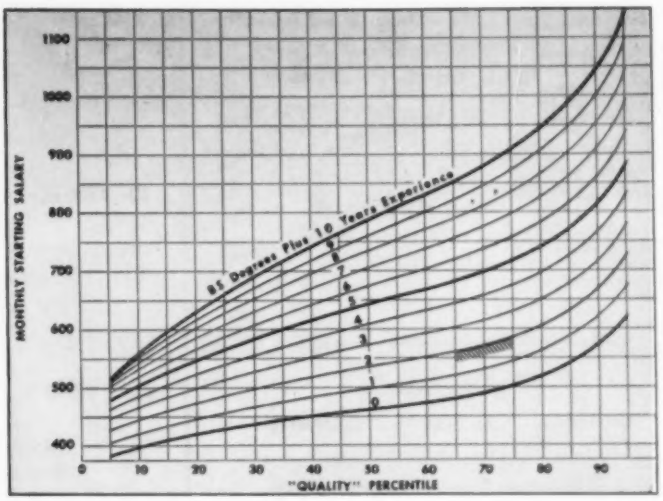
BOILER SAFETY DEVICES

Circle 1744 opposite last page

REPORTS IN BRIEF

Are you selling your future short? Rate yourself on ESA's salary guide

To help job-seeking engineers decide on minimum starting salaries and employed engineers evaluate their current pay scales, Engineers and Scientists of America offers a chart of monthly starting salaries.



Here's how the chart works.

Vertical scale at left represents monthly starting salaries in dollars. Horizontal scale represents the engineer's "quality" percentile.

Estimating his "quality percentile on the line representing his years of experience enables an engineer to ascertain a general pay scale appropriate for him.

"Quality" percentile is estimated by the engineer on the basis of the following and similar points:

- grades in college
- advanced degrees
- personal attributes such as personality and qualities of leadership
- current job status
- responsibility and difficulty of jobs handled
- professional standing as determined by society standing and recognition.

Again, this is measured by a range rather than pinpointed to one figure.

Shaded area on chart represents rating of an engineer who believes he falls between 65% and 75% in "quality" and who has between 1½ and 2 years' experience. According to chart, he can expect between $540 and $585 per month starting salary.

An employed engineer can rate his present salary by charting his pay on the line representing years of experience. His "quality" percentile can then be read at the intersection of his salary and experience lines — assuming his pay scale is correct.

Employers tend to judge an engineer's worth on the basis of his salary, according to ESA. They may offer a job applicant slightly more than he was making. But this increase is seldom a big jump up the salary scale.

Often, too, the low-paid engineer won't get a crack at the best assignments — the assignments that would do the most to further his experience and career. These plums are assigned to the engineers who get the big paychecks.

So, according to ESA, engineers who work at salaries lower than their experience and abilities warrant are selling their futures short.

Three Operations One Control

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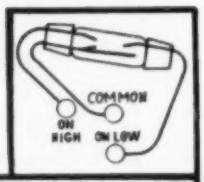

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0-20"	30	1
0-35	50	1¼
0-60	125	3
0-60	150	6
0-100	125	3¼
0-100	200	6
0-100	300	6
0-150	200	7
0-150	240	8
0-150	300	8
0-200	240	8
0-200	300	8
0-300	400	12
0-300	600	14
0-600	800	50
0-1000	1500	75

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WRITE FOR CATALOG NO. 858

THE MERCOID CORPORATION

CHICAGO 41, ILL.

Circle 1745 opposite last page

One protective control kills two boiler bugs

J. L. Barker of Oklahoma Gas & Electric Co. endorses power plant protection method used by OG&E for the last four years. Addressing AIEE South West District Meeting, Barker said new system has duplicate protective tripping devices connected in parallel.

Bugs eliminated by system are false interruptions in electric circuit that needlessly trip boiler fuel shutoff; and failure of electric circuit to accomplish fuel shutoff. Second bug could cause explosion.

OG&E uses new fuel shutoff control system on five gas-fired boilers. None of the boilers have tripped or failed because of device malfunctions. Three different times, however, a boiler would have tripped needlessly if protective device had not been in duplicate.

ASME spends $2 million on technical books

ASME published 869 technical works during 1957 at a cost of over $2 million. Publications include technical journals, periodicals, codes, industry standards. Reporter system streamlines presentation of papers at ASME meetings. Technical papers are summarized by trained reporter to cut time needed for reading paper and to increase discussion time on paper.

AEC gives $3.5 million to aid universities

Grants totalling $3.5 million are being distributed by the Atomic Energy Commission to help 55 U. S. colleges and universities train nuclear scientists and engineers. Seven universities will also build small training reactors with funds from this grant.

This brings to $6.7 million the amount given by AEC to colleges and universities within the last 10 months. ◆

VERSATILITY sells CADWELD electrical connections

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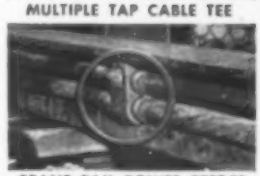
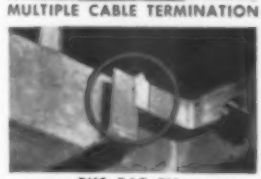

CRANE RAIL POWER FEEDER

MULTIPLE CABLE TERMINATION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Circle 1746 opposite last page

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Gentlemen:
Please send complete information on O'B-HIBIT Corrosion Inhibitor.

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Address .....

Circle 1747 opposite last page

LETTERS

Down With Guesswork!

Mr. D. W. Karger's article "Taking the Guesswork Out of Hiring" (Feb. '58) was read with a great deal of interest. Basically, he has some good ideas which may help some of those hiring Engineers. There wasn't too much in the article to dispute with the author, but there are a few points which might be added.

Job Descriptions — There were a few pointers on this phase of the article which Mr. Karger forgot to mention and which are extremely important. They are:

- Be sure to go to the job site and carefully evaluate or analyze the educational requirements. Under no circumstances put a Degree on a job that any normal technical or trade school graduate can handle satisfactorily with a little on the job training and coaching.

- Be sure of age requirements and do not automatically set a top limit of 35 or 40 just to please some one in the personnel department who is young and inexperienced himself or who is looking more at pensions or insurance premiums than the real value of the applicant to the company.

- Start out with the premise of determining the minimum requirements to fill the position immediately so the candidate will function profitably in the shortest amount of time. Under all circumstances, forget the present incumbent or the ideal or theoretically perfect person, as he doesn't exist anyhow.

- Do not confuse the long range advancement possibilities with the job description itself as each advancement into a new position at a higher level will carry its own job description for the new position.

Testing — Testing is another tool and by no means the final answer, depending upon the circumstances, the selection of the battery of tests, the person administernig the tests, and the person interpreting the tests.

Human error can occur every step of the way and as long as there is a chance of human equations entering the picture, you are limited as to the accuracy of the results.

Personality and motivation tests are useful to a certain extent, but who is capable of actually spelling out what personality and human motivation really are? Too much human bias, opinion, and preju-

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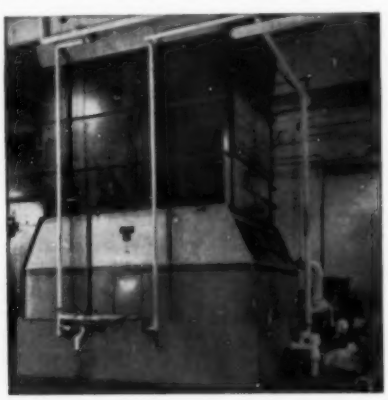

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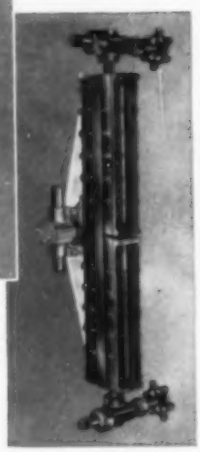

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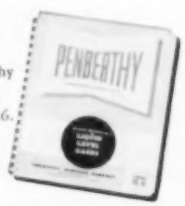

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Circle 1750 opposite last page

LETTERS

dice enters into both of these to depend on them very much.

By working to a pattern established from your present employees, you may come a trifle closer than otherwise, but these traits are still doubtful for accurate testing.

Professional Societies — By all means, be sure to explore the applicant's views on memberships and activity in Professional Societies. A sincere Engineer or Professional man usually takes his profession very seriously and wants to increase his status by associating with others in the same profession from other companies to gain professional, social, educational, or special information benefits that he can only get from his professional society.

Criteria — As a guide of accepted procedures and standards, "Criteria For the Employment of Professional Engineers," published by the National Society of Professional Engineers at Washington, D. C.

Summary — Aside from these comments, the writer agrees with Mr. Karger and hopes more people hiring Professionals will follow his suggestions.

BONNELL H. ALLEN, P. E.
Owner-Executive Director
The Professional Personnel Service
Chicago, Illinois

• *Reader Allen speaks with authority, being both a professional engineer and an employment counselor.*

Readin' . . . Writin' . . . and Rickover

Your article on education which appeared in the March issue of POWER INDUSTRY . . . is an excellent presentation, and should be read by everyone interested in schools and school curriculum.

However, you make one generalization referring to the obstacle of renovation which, I believe, could bear further investigation . . . I think that you will find local school boards all over the country awake to the situation, and the needs for change.

But . . . the professional educational organizations in the country are not at all unanimous in their attitude on the subject.

It is the tendency of local school board members to rely on the advice of professional educators. But you will find that the professional educators have not

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Circle 1751 opposite last page

endorsed such modernizations of school operations, including accelerated courses for higher IQ students, teaching of higher mathematics at lower age levels, increase in required mathematics and science credits for graduation, elimination of daytime study periods, efficiency or merit ratings of teachers, and year-round school operation at high school levels.

Furthermore, bureaucratic control of school operations on the national level, which seems to be the sole desire of certain organizations, is not the answer. This can be proved by experience with specific cases if you are interested.

John B. Baker
Canton, Ohio

Unions for engineers?

You make it quite clear that the editorial policy of your publication is: "We are opposed to unions for engineers."

. . . One reads in the same issue (Oct., 1957) . . . "In spite of the fact that many engineers are dissatisfied with the 'status quo', only about 12 percent feel that unions would benefit engineers. This percentage will increase or decrease, depending upon steps taken by both management and the engineering societies to get to the bottom of this problem." . . . The very threat of the growth of these groups is implied as the compelling reason for both management and the engineering societies to get to the bottom of the problems in the engineering profession . . .

Why turn the problem over to "other" groups such as "management" or the "engineering societies?"

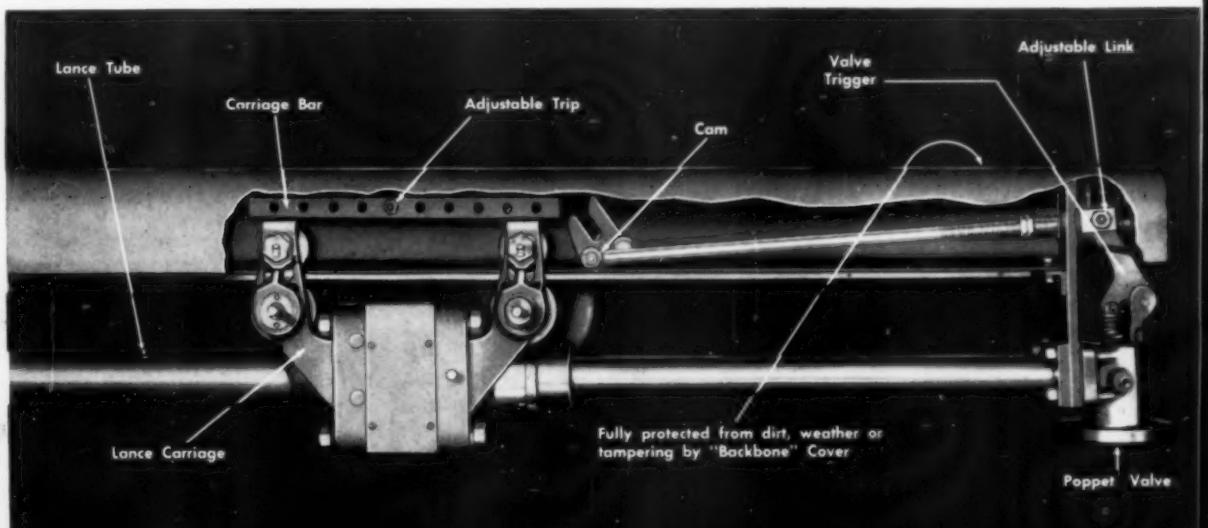
Perhaps our confusion on your editorial policy against engineers' unions could be dispelled by another article . . . "Compelling Reasons (other than engineering unions) Why the Engineering Profession Will Be Improved."

We don't believe there are any other practical compelling reasons today. If there are, the suggested article should have extraordinary engineer-reader interest.

JOHN A. GESHNER
National Vice Chairman
Council of Western Electric
Professional Employees National

• *POWER INDUSTRY tries to report realistically on all matters of current interest to the power industry. We are extremely interested in what engineers themselves think about unions. Mr. Geshner's article suggestion is a good one — any takers?*

MECHANICALLY OPERATED



Simple, Direct Toggle Principal + Direct Actuation by Lance Carriage = Positive and Accurate Valve Operation

SERIES 300 IK—LONG RETRACTING BLOWER

OTHER ADVANTAGES OF SERIES 300 IK BLOWERS

- Backbone and Protective Cover
- Compact, Accessible Electric Power and Control Terminal Facilities
- Front End Single-Motor Drive
- Nozzle-Sweep-Every-Inch Cleaning Pattern
- Improved "Type A" Nozzle
- Positive Gear Carriage Drive
- Single Point Outboard Suspension
- Oversize Lance (Step-Tapered for Extra Long Travel)
- Auxiliary Carriages for Extra Long Travel
- Designed for Quick, Easy Servicing

No other blower gives you all these advantages.

Diamond

DIAMOND POWER SPECIALTY CORP.
LANCASTER, OHIO

Diamond Specialty Limited, Windsor, Ontario

POPPET TYPE VALVE

(WITH ADJUSTABLE PRESSURE CONTROL)

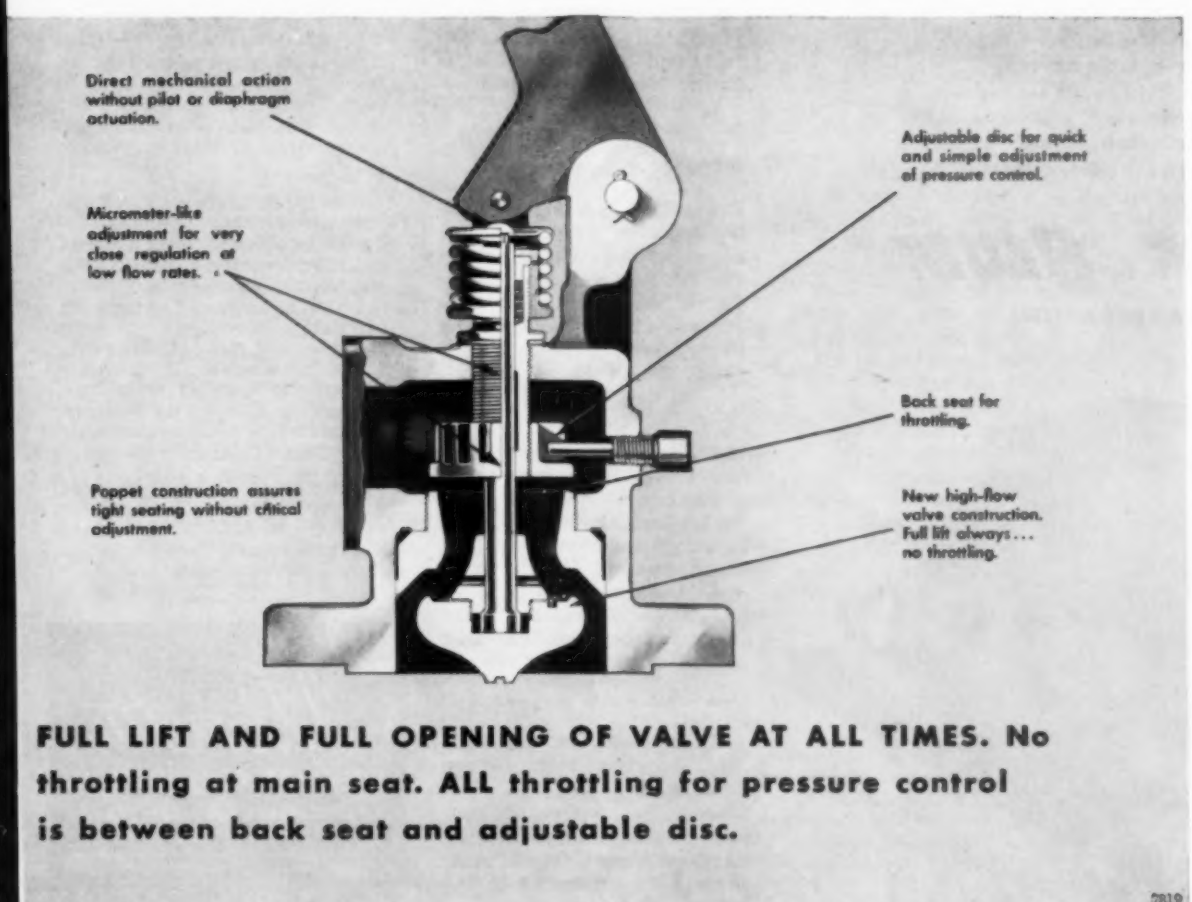
additional important features of the

New Diamond Series 300 IK
LONG RETRACTING BLOWER

This valve was adopted for the new Series 300 IK because long experience has proved it the most satisfactory of all designs for severe blower service. More than 300,000 of this basic design are in use on various Diamond Blowers and have established notable service records. A recent improvement is more streamlined flow contours that permit higher flow rates with less pressure drop.

The direct mechanical linkage for actuating the valve offers the advantages of greater reliability and safety . . . in addition to more accurate control. Numerous other important features of the Series 300 IK are listed at the bottom of the left hand page. These are the reasons why this blower is establishing a new standard of efficiency, economy and dependability in cleaning heating surfaces that require a long retracting blower.

Bulletin 2111 PI tells much more about the Series 300 IK; ask your local Diamond office or write directly to Lancaster for a copy.


Direct mechanical action without pilot or diaphragm actuation.
Micrometer-like adjustment for very close regulation at low flow rates.
Poppet construction assures tight seating without critical adjustment.
Adjustable disc for quick and simple adjustment of pressure control.
Back seat for throttling.
New high-flow valve construction. Full lift always... no throttling.
2819

FULL LIFT AND FULL OPENING OF VALVE AT ALL TIMES. No throttling at main seat. ALL throttling for pressure control is between back seat and adjustable disc.

Circle 1752 opposite last page

SPOTLIGHT ON...

PEOPLE

Recent personnel shifts at **Aluminum Company of America** include appointment of **W. E. Lawton** as Northwest Power Manager, succeeding **Waldo Porter.** Porter becomes production assistant on power matters at Alcoa's Pittsburgh headquarters.

Bryant Manufacturing Co., a division of **Carrier Corp.**, promotes **Gordon N. Gray** to vice president in charge of manufacturing. **William M. Day** is new vice president in charge of engineering.

G. N. Gray

Dr. H. J. White

Research-Cottrell, Inc. announces new executive appointments. **James M. Knox,** formerly assistant director and business manager of the **Brookhaven National Laboratory,** becomes executive vice president and treasurer. **Dr. H. J. White,** Research-Cottrell director of research and development, becomes secretary.

Sylvania-Corning Nuclear Corp. appoints **L. William Kates** director of engineering. Joining Sylvania's Metallurgical Laboratory in 1947 as an engineer, Kates has also been engineering manager and manager of commercial development in Sylvania's Atomic Energy Division.

Walker L. Cisler is elected to the board of directors of **Eaton Manufacturing Co.** Cisler is president of **Detroit Edison Co.** He was also first president, and now is a director, of **Atomic Industrial Forum, Inc.**

Dr. Karol Pilarczyk is named director of research and development at **De Laval Steam Turbine Co.** ◆

CUSTOM SHEET & PLATE FABRICATION

It takes modern equipment plus craftsmanship and know-how to produce fabrications such as the giant generator housing shown here—illustrative of Kirk & Blum's ability to produce the unusual as well as the conventional types of weldments. In its 170,000 sq. ft. plant, with crane capacity to 25 tons, Kirk & Blum has complete facilities to produce, preassemble and finish a wide variety of carbon steel, stainless, aluminum, monel and other alloys assemblies up to $\frac{1}{2}$" thickness. Fifty years of exceptionally varied experience is your added assurance that the job will be done quickly and economically.

Send prints for prompt quotations or write for detailed literature: The Kirk & Blum Mfg. Co., 3174 Forrer St., Cincinnati 9, Ohio.

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CONTROL PANELS AND DESKS
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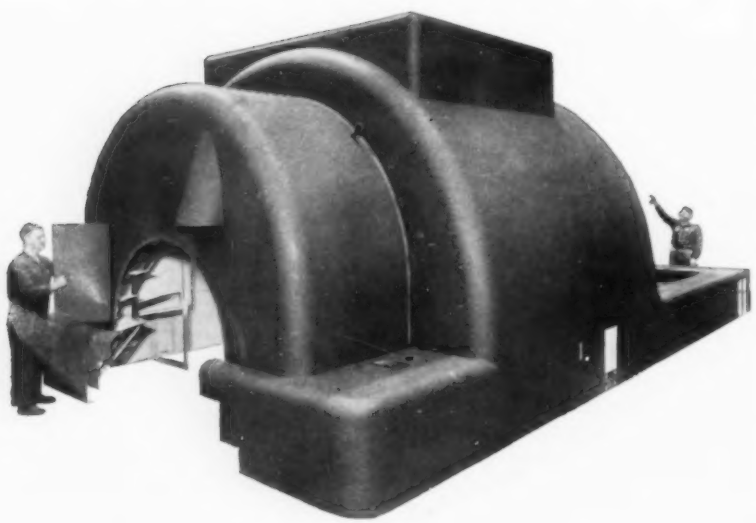
KIRK & BLUM
FABRICATION



Circle 1753 opposite last page

SPOTLIGHT ON...

GROWTH

expansions

Allis-Chalmers Manufacturing Co. announces plans for new engineering, development, and research laboratories in Greendale, two miles from its West Allis Works. Nuclear reactors and associated equipment will be designed and tested in new laboratories.

Westinghouse Electric Corp. is building new building near Utica, N.Y. to house facilities for heavy repair work on industrial and utility equipment such as motors, generators, and power and distribution transformers.

With crews available at all times, plant will be geared to undertake emergency repair work whenever need arises. Plant will also manufacture cores and coils used in distribution transformer repair.

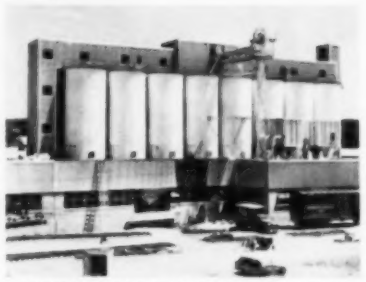
mergers

Union Spring & Manufacturing Co., New Kensington, Pa., acquires **Biggs Boiler Works Co.**, Akron, Ohio, as a wholly owned subsidiary. New subsidiary will be called **The Biggs Steel Foundry & Fabricating Co.**

Burndy Corp. has completed new central warehouse at its headquarters plant in Norwalk, Conn. Latest materials handling techniques in new warehouse will simplify storage of electrical supplies — and save thousands every year in materials handling costs.

Union Tank Car Co., Chicago, acquires both **Graver Tank & Mfg. Co., Inc.**, East Chicago, Ind., and its division, **Graver Water Conditioning Co.**, New York City. No basic changes are anticipated in operating policies or in top management at Graver. ◆

SAVE with a MARIETTA STORAGE SYSTEM Engineered to your own needs



MARIETTA STORAGE SILOS can be tied in with plant construction for efficient processing of materials.

• You'll realize a big savings in time, money and materials when you install a modern Marietta Storage System.

Sturdy, interlocking concrete stave silos save materials by keeping them dry, free from waste, protected against weather or fire. And there's practically no maintenance to Marietta storage silos.

Conveyors, feeders, discharge systems or other specially designed equipment save material handling time and speed-up your operation. Whatever bulk material you use, you can depend on Marietta's know-how to design and erect the most efficient system for your need. The complete job will be handled under one cost-saving contract or in cooperation with your engineering staff, consultants or contractor.

Write today for an analysis of your storage problem and ask for a copy of the Marietta Industrial Storage Systems Booklet.

42 Years Know-How in Precast Concrete Construction

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Circle 1754 opposite last page

MAY 1958
VOL. 74 NO. 5
POWER INDUSTRY

Here's how an accurate fuel evaluation system is helping RCA to . . .

STRETCH COAL DOLLARS

By JOHN S. COLE
Manager of Power Services
RCA Manufacturing Company
Camden, N. J.

Through experience, we have developed an accurate fuel cost computing system. It enables us to evaluate fuels and select those that give the most economical steam costs.

Our basic steam generating equipment consists of two 120,000 lb/hr boilers, operated at 850 psi and 750° FTT. These boilers may be fired with either pulverized coal or No. 6 fuel oil. They were designed and built 20 years ago, for 80% efficiency at loads from 100,000 to 110,000 lb/hr each, when fired with Central Pennsylvania bituminous coal.

This rating and efficiency is still obtained when pulverized coal is fired. When No. 6 fuel oil is fired, we lose 2% efficiency due to additional excess air that must be carried to prevent smoking. ....

To determine the heat necessary to make one pound of steam, under average condition, we calculate:

Daily average steam pressure	835 psi
Daily average steam temperature	715° F
Daily average feedwater temperature	335° F
Average boiler efficiency (Coal)	79%
Average boiler efficiency (Oil)	77%

From Steam Tables:

Heat in one pound of steam at 835 psi and 715° F	1348 Btu
Heat in one pound of feedwater at 335° F	306 Btu
Heat to be supplied, per pound of steam	1039 Btu
Heat required, per pound of steam, from coal	1039 ÷ .79 = 1317 Btu.
Heat required, per pound of steam, from oil	1039 ÷ .77 = 1350 Btu.

To determine coal costs, we accumulate all costs incident to getting the coal from mine to furnace in a burnable condition, and the cost of ash removal.

We purchase coal in lots of 700 net tons at the mine, and have it shipped in at tidewater rates to dumping piers.

We must barge and unload the coal to storage or to our day bunkers, weigh it, feed it to the mills, pulverize it, remove the ashes, pay for insurance and fixed charges, and pay our labor and overhead before we get a true cost of the coal as fired. There is also a certain loss due to windage, spillage, and fires. This also must be taken into account.

We accumulate the costs of maintenance, operating labor, and maintenance materials, and divide them by the weight of coal fired to arrive at a cost per ton. Power services are measured from meter readings and are broken down to a cost per ton of coal. Our figures are checked against accounting figures to assure accuracy. We also obtain our fixed charges from plant accounting.

With these figures, let's see how this system works out for a coal, typical of the kind we use. This is a deep-mined, well-prepared central Pennsylvania coal, which analyzed on receipt as:

Ash	7.7%
Sulfur (separately determined)	1.7%
Moisture (A.R.)	2.5%
Volatile	28.4%
Fixed Carbon	61.4%
Btu (A.R.)	13,772
Grindability	85 Hardgrove

Such coal would cost about $5.70 per net ton at the mine.

Our costs would be computed thus:

Per net ton, at mine	$5.70
Freight	3.846
Tax	0.04
Barging	0.30
Cost per net ton, at pier	$9.886
Losses (shrinkage, windage, fires 5%)	0.4943
Maintenance labor (belts, cranes, etc.)	0.08255
Maintenance labor (pulverizers, scales, chutes)	0.01128
Maintenance materials	0.09200
Operating labor (ash removal, firemen, coal handlers)	0.40031
Ac Power (belts, scales, feeders, pulverizers)	0.42500

Figures presented in this article on primary costs of oil and coal freight are for Spring, 1957. Since then there have been changes. Oil has decreased in price $67.20 per thousand gallons, delivered at the tank. Coal freight rates have increased to $4.10 per net ton for Central Pennsylvania coal, and $4.34 for West Virginia coal. In spite of these changes, we are still saving money.

J. S. COLE

STRETCH COAL DOLLARS

Dc Power (cranes)	0.08400
Steam (ash removal)	0.05550
Fixed charges (depreciation, overhead, insurance)	0.13500
Cast per net ton, as fired	$11.66594

$$\text{Cost per pound} = \frac{11.66594}{2000} = \$0.00583297$$

Heat to be supplied, per 1000 pounds steam 1,317,000 Btu
Heat per pound of coal 13,772 Btu

$$\text{Coal per 1000 pounds steam} = \frac{1{,}317{,}000}{13{,}772} = 95.75 \text{ pounds}$$

Cost per 1000 pounds steam
95.75 × .00583297 = $0.5585

We have found that there is insufficient deviation from the daily feedwater temperature, steam pressure, and steam temperature averages to materially affect the efficiency and fuel evaluation calculations.

Finding Oil Costs

Fuel oil costs can be analyzed in the same way. Coal is our main fuel, and oil is used only for emergency or standby.

Our oil has an average heat content, by analysis, of 148,125 Btu per gallon. The as-fired cost per gallon is figured as:

Oil cost, per 1000 gal.	$75.30
Delivery charge, per 1000 gal.	2.00
Cost, per 1000 gal. at tank	77.30
Maintenance labor (pumps, motors, etc.)	0.24306
Maintenance materials	0.15000
Steam to heat tanks	2.45395
Power to pump	0.49305
Steam to atomize	0.96475
Fixed charges	0.88000
Operating labor	0.73975
Cost per 1000 gal., as fired	$83.22465
Cost per gal. as fired	0.083225
Heat to be supplied per 1000 pounds steam	1,350,000 Btu
Heat in 1 gal. oil	148,125 Btu

$$\text{Oil per 1000 pounds steam} = \frac{1{,}350{,}000}{148{,}125} = 9.11 \text{ gal}$$

Cost per 1000 pounds steam
9.11 × .083225 = $0.757

Comparing these costs, we see that there is a differential in the favor of coal of $0.203 per 1000 pounds of steam. On the basis of three million pounds of steam per day, the extra cost of burning oil would amount to $609.00 per operating day.

Compare Other Coals

We can use the same method to compare the costs of various coals. As an example, coal "A" is a well prepared, deep-mined Central Pennsylvania coal selling for $5.90 per ton at the mine. Coal "B" is also a well prepared deep-mined Central Pennsylvania coal selling for $5.65 per net ton at the mine.

Coal "A"		Coal "B"
8 %	Ash	7.5%
1.5%	Sulfur (separately determined)	1.7%
3 %	Moisture (A.R.)	3.5%
26 %	Volatile	28.0%
63 %	Fixed Carbon	61.0%
14200 %	Btu (A.R.)	13700 %
100	Grindability	85

Both coals are mined in the same locality, and both come in at the same freight rate.

A comparison of as-fired costs is:

Coal "A"		Coal "B"
$ 5.90	N.T. at mine	$5.65
3.846	Freight	3.846
0.04	Tax	0.04
0.30	Barging	0.30
10.086	N.T. at pier	9.836
0.5043	Losses 5%	0.4918
0.10502	Maintenance Labor	0.10777
0.09200	Maintenance Material	0.09300
0.40031	Operating Labor	0.40031
0.44132	ac Power	0.44200
0.08400	dc Power	0.08400
0.05552	Steam	0.05552
0.13500	Fixed Charges	0.13500
11.90347	Per N.T. as fired	11.6454
$0.00595	Per pound, as fired	$0.0058227
92.8	pound coal per 1000 pound steam	96.1
0.552	Cost per 100 pound steam	0.56

On the basis of 3,000,000 pounds of steam per day, coal "A" gives a net saving of $24.00 per operating day, or $720.00 per 30-day month. This saving amounts to about $8560 per year, and is, therefore, well worthwhile.

It should be noted that as the hardgrove grindability decreases, the costs of maintenance labor and material, and the power charges increase. This is attributable to reduced grinding ease, more wear and abrasion.

Our coal pulverizers were designed about 20 years ago, when the only coal used locally was mined in Central Pennsylvania.

We buy ¾" x 0 Nut and Slack Coal, and use only cleaned premium grades. We found by experience that the soft structure coal tends to pick up moisture very readily. It stuck and clogged the chutes from bunkers to scales.

This was exceptionally true in the slack sizes, but we found the clogging could be prevented by proportioning the coal in the ratio of 60% ¾" x ¼", and 40% ¼" x 0.

Advantages of Mixing

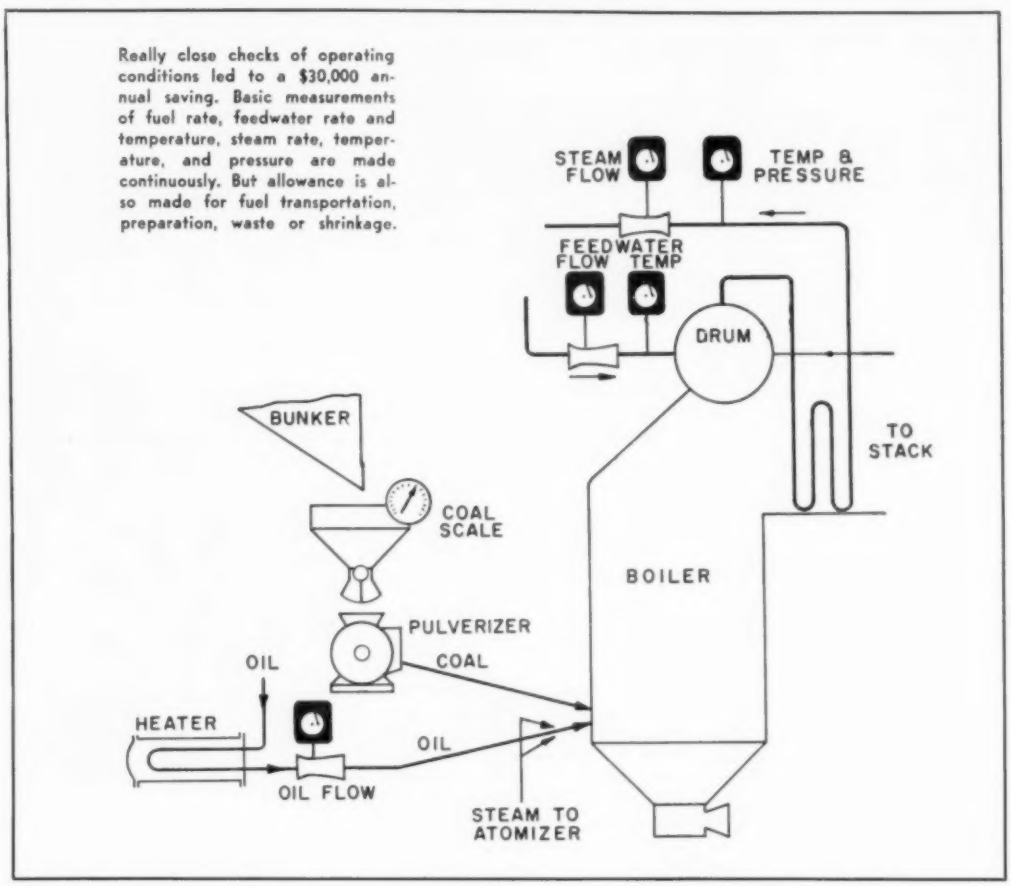
With this mixture, and with soft structure coal, we could carry full load on the boilers. Yet, no raw coal was thrown from the mill discard spouts and the coal flowed freely in the chutes.

For the past three years, cost of Central Pennsylvania coal has increased steadily. In trying to keep our steam costs down, we investigated the possibility of using West Virginia coals. Remembering our improved performance with the 60-40 mix of Pennsylvania coal, we used the same mixture of ¾" x 0 West Virginia coal.

After considerable testing, we settled on a Fairmont coal with this analysis:

continued bottom page 14

Really close checks of operating conditions led to a $30,000 annual saving. Basic measurements of fuel rate, feedwater rate and temperature, steam rate, temperature, and pressure are made continuously. But allowance is also made for fuel transportation, preparation, waste or shrinkage.



Who is responsible for safety?

BY WILLIAM T. ROGERS
Safety Director
Ebasco Services Inc.

WILLIAM T. ROGERS was graduated from the Polytechnic Institute of Brooklyn in Electrical Engineering in 1927. He began his career with the New York and Queens Electric Light and Power Company, later transferring to Consolidated Edison.

He began as Assistant Engineer, and progressed to positions of executive staff responsibility. He organized and directed the personnel department including employment, safety, medical, welfare, job classifications, and employee services.

Joining Ebasco Services in 1936 in the statistical budget and insurance department, Rogers later served as Industrial Relations Consultant. He developed the safety and fire protection activities in the insurance department, which became the basis for the present safety services.

Rogers was graduated from the Graduate School of Business Administration, New York University, MBA 1935. In addition, he attended special courses in Economics and Finance at Columbia University School of Business up to 1941.

He is active in safety committees with the professional societies. To name a few: Member and past Chairman, Accident Prevention Committee, Edison Electric Institute; Member and past Chairman, Accident Prevention Committee, American Gas Association; Member and past Chairman, Executive Committee, Public Utilities Section, National Safety Council.

An important step in formulating a public utility company safety program is to determine where the responsibility for safety lies. Actually, everyone is responsible. The president, the vice presidents, managers, department heads, superintendents, foremen, and every employee bears a direct responsibility for the safety program.

The responsibility for safety is three-fold. It rests on management, on supervision, and on employees.

Management is responsible for safety because management is responsible to the company's stockholders, to the public, and to the employees for company operation in a safe and efficient manner. Management is responsible for protecting the public and employees from injury and damage, for safeguarding and conserving the company's assets, and for rendering continuous and efficient service at lowest possible cost.

Supervision is responsible for safety because supervision is management in action. Supervision (department heads, superintendents, foremen) has a dual responsibility for safety. It is responsible to higher management for safe and efficient production. It also is responsible for the safety and welfare of the employees.

Employees are responsible for safety because it is their duty to work in an efficient and "skilled" manner. Accidents damage equipment and delay production. Employees are responsible to themselves, to their families, and to the nation for avoiding injuries and time lost from the job. Employees are the ones who get hurt. Employees are responsible to their foreman for doing the job safely and to their fellow workers in not causing injury to them.

In organizing a safety program for a utility company, one thing is clear — management cannot delegate responsibility to a safety engineer or a safety department and then forget about it. Safety cannot be divorced from operations or treated as a side line. Safety is an integral part of operations and a function of the line organization and supervision.

This does not in any way depreciate the importance of the safety engineer or safety department, but recognizes this activity as a staff function. The safety department provides the inspiration, information and advice, but program execution rests squarely with the operating organization.

Safety activities in a company can be organized in a number of different ways — no two safety organizations are alike. What works successfully in one company will not always work in another.

There is no standardized method or way to get results. Safety programs must be "tailor made" to fit the needs, organization, characteristics, mores, and personnel of a particular company. There are, however, several key points that should be basic in every safety program. They are:

Engineering, Design, and Construction: Safety begins on the drawing board. Emphasis must be placed on the design, construction, and maintenance of a safe plant. Tools and equipment must be purchased with safety as a major consideration. All necessary protective equipment and devices must be provided.

Personnel Practices: Employment and advancement policies must be geared to safety requirements. Good men must be provided and trained. Good working conditions must prevail, and welfare programs must be designed to improve morale and promote safety.

Training: Job analyses should be the basis of training men in improved job methods. The objective of all safety training programs should be: training men for advancement, training supervision in leadership, and general safety education to improve attitudes and the will to work safely.

Supervision: Supervisors must be selected with an eye to safety qualifications. Safety

MOTOR MAINTENANCE TIP:

Use Shovel Regularly

Without the vigorous use of a shovel, this Fairbanks-Morse 100 hp. motor would be buried under corrosive coal dust. Even so, as it drives a briquette press 16 hours a day, there is a cloud of coal dust coating motor windings and inhibiting normal cooling . . . steam and sulphur release sulphuric acid that can cause mechanical and electrical failure.

YET—After eight years in this rugged service the slip-ring motor in its dripproof frame has operated at peak efficiency without a single breakdown. Other F-M motors in this same difficult environment have operated more than 40,000 hours without breakdown—completely eliminating motor failures where such failure was commonplace before.

There is no better way to judge design advantages than to look at the long performance record of equipment in service. Your nearby Fairbanks-Morse Motor Specialists can show you many applications similar to your own.

When Performance Is the Measure,
F-M Motors Are the Standard.

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FAIRBANKS-MORSE
a name worth remembering when you want the BEST

ELECTRIC MOTORS AND GENERATORS • DIESEL LOCOMOTIVES AND ENGINES • PUMPS • SCALES • RAIL CARS • HOME WATER SERVICE EQUIPMENT • MAGNETOS

Circle 1755 opposite last page

must be the responsibility of supervisors. They must be trained for leadership, given full responsibility, and backed up in their policies and decisions.

Inspection: An inspection system must detect hazardous conditions, to prevent fires and explosions, and to observe unsafe practices. Follow-up corrective procedures are essential to a well-rounded safety program.

Investigation: A thorough, well-administered accident investigation procedure is a must in any well-organized safety program. Facts must be disclosed that will aid in preventing similar accidents and fix responsibility for the accident whether it be management, supervision, or men.

Leadership: Management's continued active interest and direction of the safety program (the priceless ingredient).

Every utility company has a safety program of some kind, whether or not they have a formalized program as such. Safety features are incorporated in the design and specification of the plant, and the company must abide by state and local rules, codes, and regulations. How much further a company goes in safety, beyond these minimum requirements, depends upon the degree of recognition that management gives to the importance of safety and its willingness to expend time, money, and effort. ◆

Stretch Coal Dollars

continued from page 12

Ash	8.0%
Sulfur (separately determined)	2.5%
Moisture (A.R.)	2.5%
Volatile	35.0%
Fixed Carbon	54.5%
Btu (A.R.)	13,750
Grindability	72

Such a coal costs about $4.80 per net ton at the mine, with freight at $4.09 per ton. Our costing method makes the as-fired price $11.02587 per net ton, or $0.00551294 per pound, and gives a fuel cost per 1000 pounds of steam of $0.528.

We found that with this coal we could carry up to 75%

rated load. Above this rating, however, raw coal was thrown from the mill discard spout because the larger sizes, returned from the classifiers, tended to clog the mill.

We tried mixing 50% of this coal with 50% Pennsylvania coal and found that we could eliminate the raw coal in the mill discard at all loads. We also obtained better flame characteristics and stability at low loads due to the higher volatiles. Using this 50-50 blend of West Virginia and Pennsylvania coals, fuel cost was $0.5432 per 1000 pounds of steam.

We then discovered that the harder structure West Virginia coal did not take up moisture as readily as the softer Pennsylvania coal. Less ¾" x ¼" was required to prevent the coal clogging in the chutes.

We then contacted our principal supplier, who readily agreed to further our experiments. Their preparation plant decreased the ¾" x ¼", and increased the ¼" x 0, first to 50-50, then to 40-60 and finally to 30-70.

With each decrease of pea sizes in the coal, our load-carrying ability increased. At the 30-70 proportion, we could carry rated load on the boilers, with no raw coal in the mill discard. Our flame stability and characteristics were very good throughout the entire operating range.

We also found that the 30-70 mix required about 5% more mill power to grind than did the 60-40 mix of Central Pennsylvania coal.

We can thus operate on 100% West Virginia coal at a differential of $0.028 per 1000 pounds of steam — a saving of $84 per day, or over $2500 per month.

Our conclusions from these experiments are that mill capacities can be increased, and harder structure coals can be used successfully if the ratio of pea to slack can be properly controlled. We cannot tell as yet if there will be a decrease in maintenance costs. We consider it unlikely, however, because we have done nothing to change the abrasive nature of the harder coal.

We feel, though, that a $30,000 annual reduction in fuel costs fully justifies our experiments. ◆

MOGUL-IZING wet-type dust collectors save $4,940.00 annually at HOUDAILLE INDUSTRIES, Inc.

MOGUL is added to collector through this clean out door, previously used as access for hand cleaning.

Sludge now remains soft and is easily removable. Prior to MOGUL treatment it was necessary to use a pick to loosen the hard mass.

Write for *additional Performance Reports* and complete information without obligation.

The North American MOGUL Products Company

Standard Building • Cleveland 13, Ohio

The nationally known firm of Houdaille Industries, Inc., manufacturers of high quality automobile hardware, operate twelve high speed belt polishers in the manufacture of automobile bumpers at their Huntington, West Virginia plant.

Mr. Larry E. Day, Plant Engineer at Houdaille, ran a 30 day test with MOGUL endeavoring to eliminate the sludge problem and, at the same time, to operate the system at a higher efficiency. Results were so conclusive that MOGUL is now used in the entire dust collector system.

The Houdaille savings story is another outstanding example of the advantages in MOGUL-IZING – the *modern* method of water treatment technology.

SPECIALISTS IN INDUSTRIAL WATER TREATMENT FOR OVER 40 YEARS

Circle 1756 opposite last page

IS BIG BUSINESS NECESSARY?

By LAMMOT DU PONT COPELAND
Chairman of the Finance Committee
E. I. du Pont de Nemours & Company

What makes America great? Among many factors which could be cited, it seems to me there are two so compelling they can hardly be overemphasized.

The first is freedom of the American people to do the things which promise to contribute to their individual and collective welfare.

The second is their unique willingness, ingenuity, and ability to cooperate with each other in whatever degree is required for accomplishment.

Unfortunately, I think there is need for a better understanding of the role of capital in our industrial progress. This ties in with profits, wages, and prices. It is one of the favorite hunting grounds of some labor union officials.

Voluntary cooperation is the basis for our business system. First came partnerships and smaller businesses, which were sufficient when the country was being settled. With growth of population and technology, there was an evolution of businesses of all kinds and sizes to meet the more complicated needs of the people.

The system worked. It has given us an unprecedented standard of living, and it has made the United States the most powerful nation in history.

No one in his right mind would suggest the system as a whole should be broken up. There could be only one result — chaos.

Big Bad Business

Widespread misunderstanding still seems to exist, however, over the role of big business in this system. We hear proposals that big companies should be broken up because of their so-called "economic power" — or just because they are big.

This seems to grow from a tendency to confuse bigness with monopoly, although monopoly is prohibited by our antitrust laws.

The truth is that we must have large companies. Even if they were as selfish or as evil as their critics say, we should still have to have them. We cannot survive as a nation without them, and if they should be broken up, it would be necessary to devise some new institution to take their place.

But I am not sure whether people in general understand why this is so. I am not sure they realize the size of any company is dictated by only two factors — the size of the job to be done, and the extent to which the company satisfies the customer.

I saw an estimate the other day that it would be necessary to risk an investment of $500,000,000 to launch a new company to manufacture automobiles.

Under present tax laws, it would be difficult enough to raise risk capital of this amount. But I suspect it would be even harder to find the magnitude of management and technical skills required for such an undertaking.

At the risk of being accused of self-pleading, which I gladly admit, let me cite another example.

The Du Pont Company is a big business by almost any standard of measurement. During the Second World War, it built and operated the Hanford atomic energy plant at government request. Because our business is peacetime chemicals, operation of Hanford was turned over to another company after the war. Du Pont again concentrated on making nylon, cellophane, paints, and other chemical products.

Government Request

Despite this withdrawal, the government approached Du Pont in June 1950, and asked that we build and operate the Savannah River plant for producing materials for atomic and thermonuclear weapons.

We were reluctant to undertake this difficult assignment, but we did so (for a fixed fee of one dollar) for two reasons.

First, we were told the project was vitally important to U. S. defense and security.

Second, the AEC considered the company's human and technical resources, as well as its broad experience (particularly at Hanford), made it uniquely fitted for this task.

In a way, the Sputniks may have done the United States a favor. Again they have focused national attention on an undeniable fact: when the chips are down, you must have the organizations — of whatever size necessary — that can produce the required results.

You would have to have them even if they were as pernicious as their worst critics say.

But the truth is that they are not pernicious at all. How does a large company differ from a small one?

Not in its employees being more honest or less honest.

Not that in their daily dealings they are more or less concerned about doing unto people with whom they deal as they would like to have done unto them. They differ mainly in that a large company simply has more people and more diversified talents than a small one.

Another frequently heard fallacy is that big companies, as a rule, compete with small ones and use their "economic power" to drive the little fellow out of business. The fact is that large and small businesses complement each other,

LAMMOT DU PONT COPELAND, a director, vice president, and chairman of the Finance Committee of E. I. du Pont de Nemours & Company, was born in Christiana Hundred, Del., on May 19, 1905, the son of Charles and Louise d'Andelot du Pont Copeland. He is a great great grandson of E. I. du Pont, founder of the company.

Mr. Copeland started with the company at the control laboratory in the Fairfield, Conn., plant of the Fabrics and Finishes Department in September 1929. His election as a director came in 1942, and as a member of the Finance Committee in 1943. He was elected Secretary in May 1947, and designated chairman of the Finance Committee and elected a vice president in October 1954.

Late in 1944, he was elected a director of the General Motors Corporation as one of the representatives of his company's important investment in General Motors.

Graduated from Wilmington Friends School, Mr. Copeland went to Harvard University where, in 1928, he received a degree of BS in Industrial Chemistry.

He is a past president and an honorary director of the Wilmington Society of the Fine Arts, vice-chairman and past president of the Delaware Safety Council, a director of the United Community Fund of Northern Delaware, Inc., and in 1948 served as campaign chairman.

In addition, Mr. Copeland is a director and president of the Winterthur Corporation, a trustee and vice-president of the Longwood Foundation, a trustee and treasurer of the Eleutherian Mills-Hagley Foundation, and a trustee of the University of Pennsylvania.

and neither could survive without the other.

Our company last year bought $860,000,000 worth of materials and services from more than 30,000 different suppliers, large and small. It sold nearly $2,000,000,000 worth of chemical products to more than 100,000 customers, large and small. Incidentally, it competed with more than 10,000 firms for this business.

I wonder if those who would break up big business ever think what would happen to the tens of thousands of filling stations, garages, motels, and roadside restaurants if we didn't have large companies manufacturing automobiles?

Or, conversely, what would happen to Du Pont if we didn't have the thousands of textile firms, garment manufacturers, and retail stores which deliver our synthetic fibers to the ultimate purchaser as finished products?

Check the Record

Many basic materials of industry can be manufactured economically only under conditions of mass production in large factories. And generally speaking, it is only the large companies that can afford costly research and risk huge investments required to bring new products to the market.

Let me cite some examples.

In 1916, this country had no dyestuffs industry worthy of the name. We were dependent upon German science for dyes, and for associated medicinals and other chemical products.

It took Du Pont a long time to learn how to make dyes, and a longer time to learn how to do it profitably. By the time profits offset losses, we had invested $43,000,000.

Fixation of atmospheric nitrogen by synthesis of ammonia took about 10 years and $27,000,000. Who benefited? Du Pont, did of course. But so did the farmers who no longer had to depend on a foreign source for this ingredient of fertilizers, and so did the American consumer.

Over a 30-year period, our company spent $30,000,000 on rayon research. On nylon, we spent 13 years and $27,000,000 for research and operating investment before we could get into satisfactory large-scale commercial production. Research requires patient men — and patient money.

Cellophane is a product that has sparked the establishment of a great many small businesses. Only about 60% of our cellophane is used as shipped. The other 40% is converted into bags, tape, ribbon, etc., and there are 400 firms in this field. Some have grown from an idea and a few dollars into companies of national reputation.

Finally, Du Pont has more than $20,000,000 invested in its Chestnut Run laboratories which are devoted solely to providing technical assistance, without charge, to its customers — mostly small businesses.

This is not done out of altruism. The purpose is to broaden the market for the company's products, and if it helps our customers' business, so much the better.

Big businesses are not perfect — they make mistakes. But it should be emphasized that most of them expect to be around for a while. They know the only way to accomplish this is to treat people fairly and decently, whether they be customers, suppliers, employees, stockholders, or neighbors.

Role of Capital

Where the debate about the role of capital in our industrial progress comes is this. Who is responsible for this progress? Is it labor? Do employees work harder or longer than they did in the early days of manufacture? Not at all. As a matter of fact, it is almost universally true that they do not work as hard or as long.

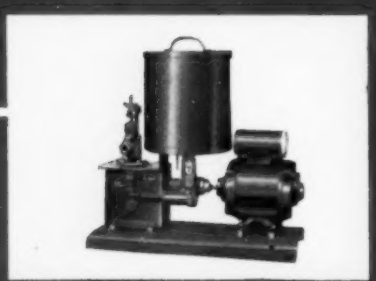
And why? The answer is that instead of human power, we use more mechanical power. Our tools are the complicated and costly plants developed by industry through technological research.

The money to build these plants is furnished mostly by

assures precision metering!

CHEMICAL FEEDERS by Manzel give accurate, dependable metering of chemicals, acids, oils, and many other liquids. Rugged, trouble-free units are available in large or small capacities, with single or multi feeds, for any type of drive. Delivery from one cc/min/feed to one gal/min/feed, against pressures to 5000 psi. Consult your Manzel field engineer for full details and recommendations.

MANZEL



WRITE FOR FREE COPY of new Chemical Feeder Catalog. Detailed information permits you to select the right feeder for any job.

Manzel

208 Babcock Street • Buffalo 10, New York

Specialists in metering pumps and lubricators since 1898

Circle 1757 opposite last page

investors who have saved it instead of spending it.

In the face of this sort of people regarding the investor as a sort of parasite who lives off the working man.

The fact is, if it were not for investors and the tools and technologies they have provided, many of us today might be working in the mines of Siberia.

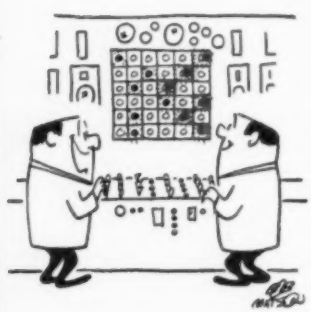
Hidden Dangers

Not all attacks on big business are direct. There are some who follow the "divide-and-conquer" tactics of trying to pit small businesses against larger enterprises.

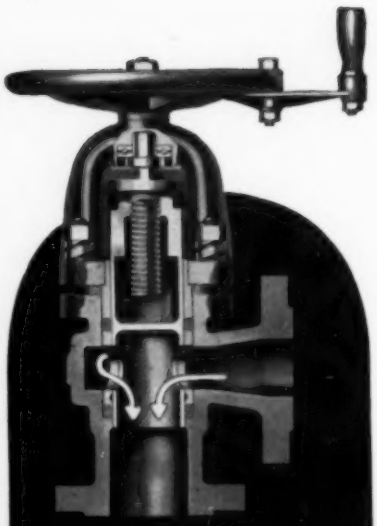
They advocate a progressive income tax on corporations, and some are even frank enough to admit this would tend to force the "voluntary dissolution" of big companies. It would do this by taxing large concerns at much higher rates than small firms.

Obviously, it would then pay to break up the big companies into smaller units to get lower tax rates. The unfairness of such tax is shown by this example.

If two people invested $5000 each in a small company, which earns a profit of 10%, the equity of each would increase by $500.



"OK, it's your move."



YARWAY SEATLESS BLOW-OFF VALVES

the lowdown on blowdown

Over 16,000 boiler plants depend on Yarway Seatless Blow-Off Valves. Pressures to 600 psi. Single or tandem combinations. For free Blow-Off Valve Book write YARNALL-WARING CO., 100 Mermaid Ave., Philadelphia 18, Pa.

Branches in all principal cities.

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Circle 1758 opposite last page

Suppose now that 2000 people invested $5000 each in a large company, which also earns a profit of 10%. The increased equity of each of the 2000 investors also would be $500, if the tax rate on each company were the same.

But if we had a graduated corporate income tax, the company with the $10,000,000 investment would have to pay much more in taxes, proportionately, than the one with the $10,000 investment. The stockholders would receive much less in dividends from the profits remaining after taxes.

It would only be reasonable to assume they would begin to think about investing their capital only in small companies.

'Formula for Destruction'

This, of course, would destroy all incentive for growth of business firms, and would bring industrial stagnation. The graduated corporate income tax is a formula for destruction. It would work while we sleep, quietly pull our system to pieces, and make a present of the free world to the communists.

I do not question the sincerity or good intentions of those who back such measures. Unfortunately, it won't matter whether they are sincere or not if they bring calamity upon us.

It seems imperative to have better public understanding of these issues. If understanding doesn't improve, the resulting public attitudes toward business and industry will be severe enough to put a brake on our progress.

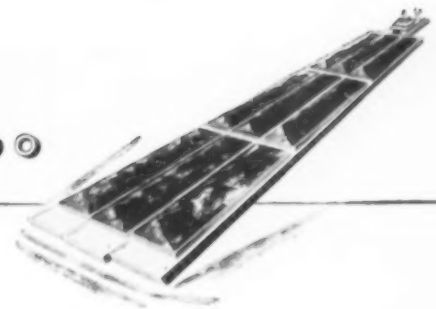
And of all periods in our history, this is no time to apply the brakes.

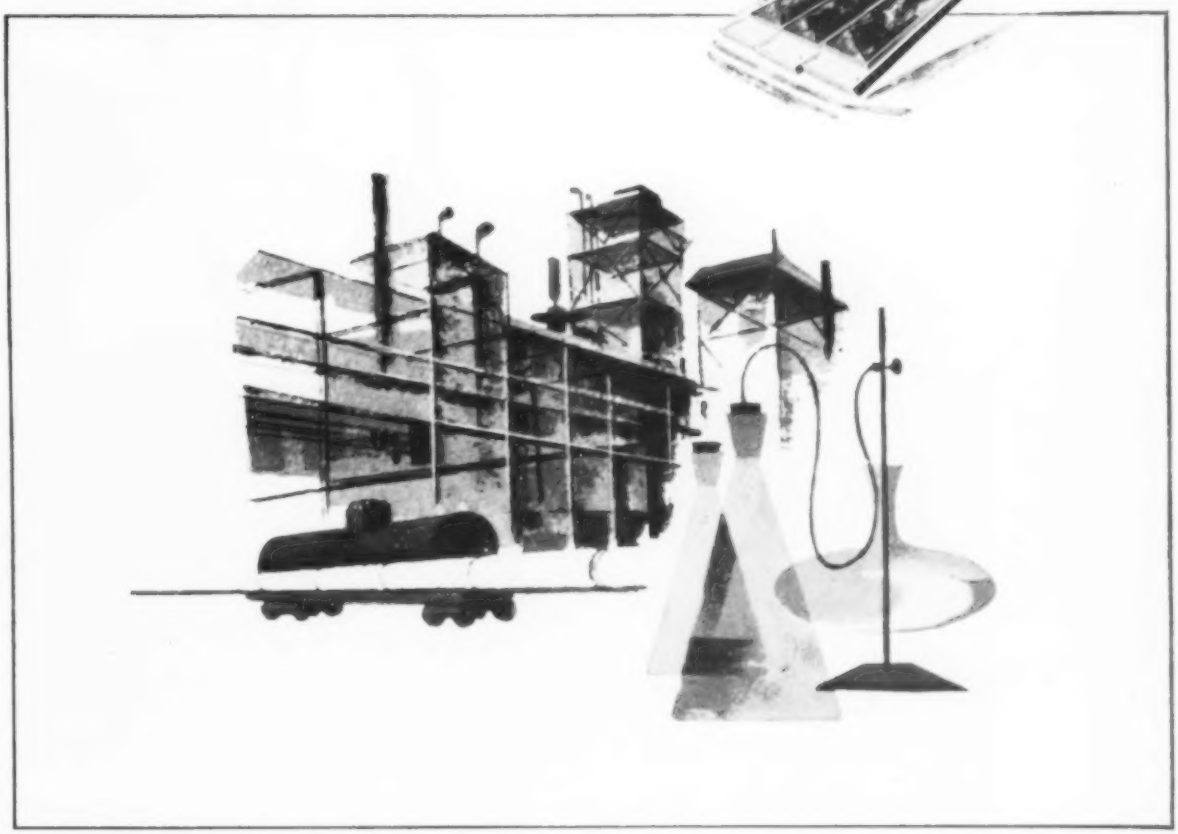
We are up against a world situation in which nothing less than our best can bring us through as a nation. Now is the time to look the realities of life in the face, to treat the American people as adults.

There simply is not time to flatter them with juvenile tributes to American genius, American might, and American greatness.

The world will judge our genius, our might, and our greatness by what we do and not by what we say about ourselves. ◆

CHEMICALS ...





...one of the basic industries supplied by UNITED ELECTRIC with coal shipped by the All-Water Route on the Inland Waterways and to Great Lakes Ports

United Electric pioneered the all-water route which now makes huge tonnages of coal available by low-cost transportation to public utilities and industries on the Inland Waterways and at Great Lakes Ports. This new economical coal distribution service offers you important benefits. The United Electric Representative will be glad to give you full information.

BUFFALO CREEK	FIDELITY	CUBA-BUCKHEART	MARY MOORE	RUBY
washed West Kentucky No. 6 industrial and domestic stoker coal	*domestic and industrial stoker coal*	*precision prepared coals*	*No. 7 Illinois for industrial and utility use*	*washed West Kentucky No. 11 for industrial and domestic use*

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THE UNITED ELECTRIC COAL COMPANIES

CHICAGO, 307 N. Michigan Ave., Phone CEntral 6-6580 • PEORIA, Commercial National Bank Building, Phone 3-3711 • ST. LOUIS, Ambassador Building, Phone GArfield 1-3732

Circle 1759 opposite last page

In All

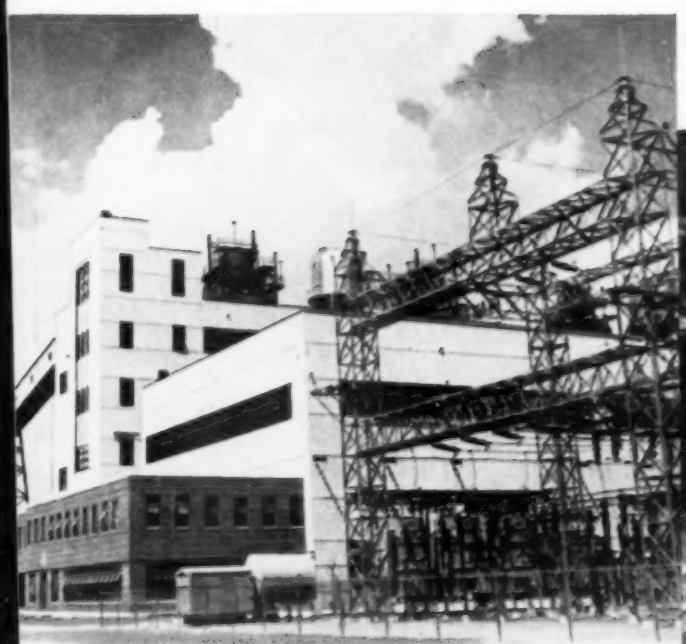
Hammond Plant near Rome, Georgia. Three 100,000 KW steam-electric units are in operation.

14" Alloy Steel Gate Valve
Pressure Seal Type
Geared Head Operation.

16 Steam Generating Units

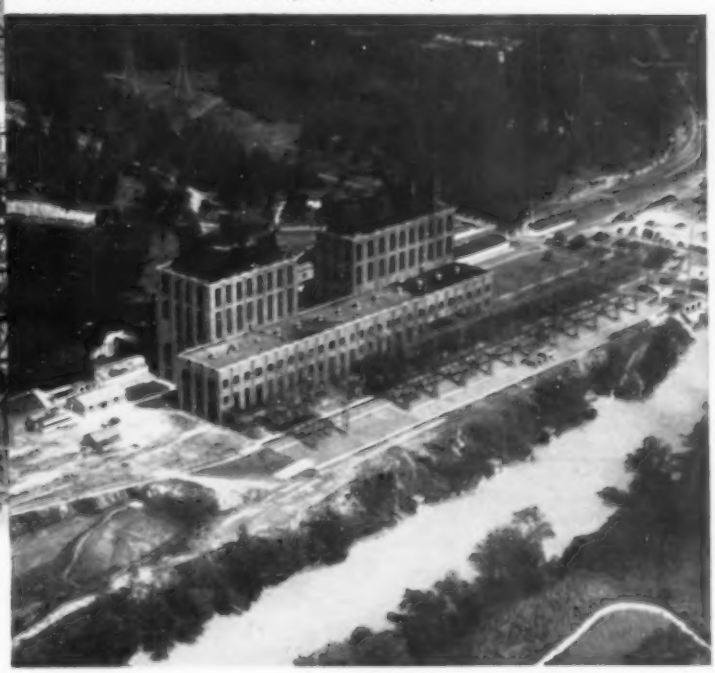
CHAPMAN VALVES

do their part to serve the Citizens of Georgia



Yates Plant near Newman, Georgia. Three 100,000 KW and two 125,000 KW steam-electric units in operation.

Plant Atkinson at Atlanta. Four 60,000 KW units in operation.



You'll find 16 generating stations of the Georgia Power Company located throughout that great state. More units are constantly being added. Total capacity of this huge system, existing and under construction, is 1,843,680 kw . . . an extensive service to the citizens of Georgia.

In every one of the 16 generating plants, engineered by Southern Services, Birmingham, Alabama, you'll find Chapman High Pressure Valves playing their part.

These valves have been selected for many of the major services in each of these plants because they give excellent continuous service under severe operating conditions. They meet the growing demands of increased temperatures and pressures which are requirements for modern power plant operations.

The CHAPMAN *Valve Manufacturing Company*

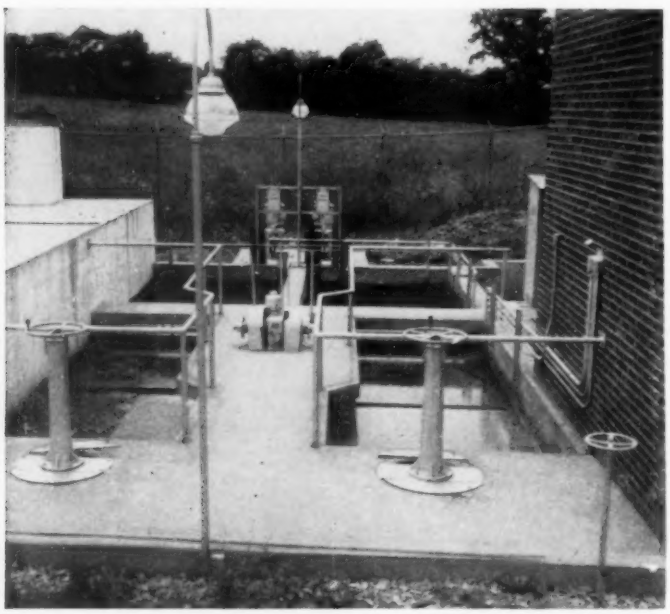
INDIAN ORCHARD, MASSACHUSETTS

Looking ahead. When it comes to valves, if you are looking ahead to tomorrow's requirements talk with the Company that is looking ahead . . . Chapman Valve Manufacturing Company. Chapman will plan with you, work with you, *produce for you.* Chapman has the engineers, metallurgists, experience and manufacturing facilities to design, develop, build and test the valve equipment you need no matter how tough the requirements. Write and we'll gladly consult with you.

For more information on product at left, circle 1760 see information request card opposite last page.

NEW DEVELOPMENTS

Improved tank design aids settling



Sewage treatment installation is efficient, economical

Improved settling tank design increases efficiency of solids removal, offers economical construction. New design attains uniform influent distribution across tank, uniform flow throughout entire length, and uniform effluent discharge from surface.

Companion sludge collectors provide positive removal of scum from the liquid surface and sludge from tank bottom.

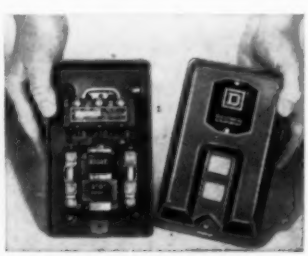
(Settling tanks are products of the Link-Belt Company, Prudential Plaza, Chicago 1, Illinois.)
Circle 1761 opposite last page.

Manual starters have snap-open contacts

Redesigned integral horsepower manual starters in NEMA sizes 0 and 1 have toggle action mechanism for positive snap-action to open and close contacts.

Metal alloy relays give trip-free overload protection. Self-centering pushbuttons indicate overloads.

Starters control motors to 7½ hp. Rated to 600 volts ac or 250 volts dc. Come in 2-, 3-, or 4-pole construction. Pressure wire connectors are provided on all wiring terminals to simplify installation.



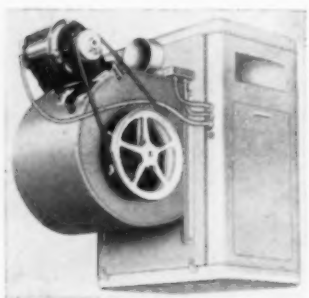
Toggle switch eliminates dead center position

(Class 2510 manual starter is built by Square D Co., 4041 North Richards Street, Milwaukee 12, Wis.)
Circle 1762 opposite last page.

Pre-assembled heaters install in less time

A saving in installation time of one hour per heater is estimated with completely pre-assembled blower-type gas unit heaters.

Redesigned heaters now have all controls and connections concealed inside heater casing. Control assembly is located at side of heater behind snap-out panel.



All controls are unified behind snap-out panel

Standard unit heaters are AGA approved for use in duct systems with static pressures to 0.2 inch. They produce 25,000 to 300,000 Btu.

(US-B blower-type unit heaters are manufactured by Reznor Manufacturing Co., 70 Union St., Mercer, Pa.)
Circle 1763 opposite last page.

Plastic pipe is lighter but strong as steel

Corrosion-resistant reinforced plastic pipe is being manufactured in 2- to 12-in. diameters. Patented pipe manufacturing process employs interwoven fiber glass filaments, impregnated with epoxy resins, and heat cured.

New pipe is available in 20-foot lengths with plain ends, bell-and-spigot, or flanged.

Pipe is nontoxic, nonflammable, and does not cold flow or sag in use. Recommended uses are: sewage and industrial wastes and gases, fresh and salt water, and as structural tubing and conduit. Its smooth, friction-free surface assures minimum friction loss.

Two standard series are in production: 250 psi working pressure, and 500 psi working pressure. Both have a 10 to 1 safety factor.

Tensile strength is 80,000 psi circumferential and 40,000 psi longitudinal. Specific gravity of plastic pipe is one-fourth that of steel pipe.

(Reinforced plastic pipe is a product of the Amercoat Corporation, 4809 Firestone Boulevard, South Gate, California.)
Circle 1764 opposite last page.

Safety treads halt slips even when doused in oil

Aluminum alloy safety treads with abrasive ribs provide anti-slip traction even when covered with oil. Treads are made of heat-treated extruded aluminum alloy with locked-in ribs of abrasive grit.

Treads are easily installed over worn, unsafe masonry or wood stairs

They are 9 inches wide with tapered beveled back. Worn or slippery stairs, of masonry or wood, are easily corrected by installing safety treads.

(Safety treads are a product of Wooster Products, Inc., Foot of Spruce St., Wooster, Ohio.)
Circle 1765 opposite last page.

Automatic incinerator is self-cleaning

Incinerator for industrial and municipal refuse automatically disintegrates or burns combustible solids such as garbage, waste paper, wood

refuse, sawdust, shavings, board ends, cuttings.

Heat from incinerator can be used for steam and power production.

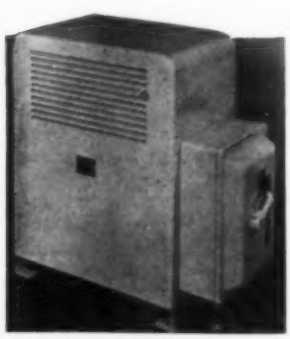
Incinerator has a porous fuel bed that flows over a level jet-action flat top toward discharge end outside furnace. There the cool residue drops into a conveyor or pit. Flat top rolls on heavy rails.

(Combustikator Combustion System was developed by Combustikator Incineration Engineers, Div. American Coal Burner and Wood Stoker Corp., 1133 West Cornelia Ave., Chicago 13, Ill.)
Circle 1766 opposite last page.

For more information on items reported in the New Developments section, circle corresponding numbers on reader service card opposite last page.

Breaker rides piggy-back on dry-type transformer

Transformer-breaker package includes dry-type distribution transformer with breaker mounted on transformer side. Breaker is connected internally to transformer high-voltage winding to save space and eliminate conduit run and condulet fittings necessary for remote breaker mounting.



Transformer, breaker combine to make integral package

Transformer-breaker packages are rated for 300-kva and below.

Breaker on transformer aids proper coordination between

About the Cost of Living . . . with Steam Traps

WHEN YOU specify steam traps, what could possibly be more important than *the cost of living with them*— production cost . . . steam cost . . . downtime cost . . . repair cost.

No steam traps manufactured have ever provided greater equipment operating efficiency or lower trap maintenance cost than Armstrongs.

Consider the experiences of these companies:

"30% Greater Output **from platen presses since installing Armstrong Traps"— rubber processor.**

"$8000 Annual Fuel Saving **since replacing 600 traps with Armstrong"— metal processor.**

"30% Less Downtime **for repairs with Armstrong Traps"— food processor.**

"$25,000 Trap Maintenance Saving every year since installing 4000 Armstrong Traps"— major chemical plant.

You may well ask, "Can there really be so big a difference in steam trap performance?" The answer is: These are typical experiences of people who have compared Armstrong trap performance — not for a month or a year, but over periods of 2, 5 and even 10 years or more.

The Armstrong trap has certain fundamental advantages, including:

No Steam Loss — the valve is always water-sealed.

Large air-venting capacity — air is automatically discharged along with condensate.

Long-life parts — hardened chrome steel valve and seat — all other parts corrosion-resistant stainless. Absolutely nothing to stick, bind, clog or collapse. Not affected by ordinary dirt and scale.

Unconditionally guaranteed to satisfy. It takes an awfully good product to carry such a guarantee.

Steam traps can have such a big effect on plant operating efficiency, they are worth more than casual consideration. Let your Armstrong Factory Representative answer your questions. There is no obligation. Call him or write:

ARMSTRONG MACHINE WORKS
8203 Maple Street • Three Rivers, Mich.

Do you have "The Steam Trap Book"? —44 pages of useful data on trap sizing, calculation of condensate loads, installation and maintenance. Free on request.

ARMSTRONG STEAM TRAPS

Circle 1767 opposite last page

RAMBLINGS ON INSTRUMENTATION

(Our advertising manager, a beleaguered soul, has asked that we doff the mantle of restrained intimacy with which we approach these "Ramblings" and, for crying out loud, put some punch in this particular column. Regular readers may be shocked but, it is hoped, will sympathize with the pressures that beset us. So they want an ad with some socko, hey. Here goes:)

New Hays Universal Recorder Acclaimed As "Not Bad!"

Those who saw it for the first time couldn't believe it! That's right . . . the group that first saw the new Hays recorder at a trade show preview simply couldn't believe that anyone could be silly enough to bring a new recorder into a world already glutted with recorders.

However, when they were told that the new Hays Universal Electronic Recorder has the new, streamlined "sheer look," their indifference changed to apathy!

Furthermore, when one hardboiled plant superintendent heard that the new Hays recorder has three basic interchangeable receiver units, he said "*Ummh.*"

That's not all! When this group actually saw with their own eyes how an almost unlimited variety of variables can be recorded—all in one basic recorder—they turned to one another and murmured, "What's for lunch?"

(At this point we discovered we were at the wrong show . . . the National Pickle Packers Convention, as a matter of fact. Some mix-up about dates.)

As it turned out, the pickle packers actually *were* intrigued by the recorder's new Hays Constant Voltage Unit for potentiometer applications . . . especially when they learned that this little Rock of Gibraltar has a stability of ±0.05% on a 20% supply voltage variation. And, no standard cells, batteries, sleight-of-hand or electronic tubes are involved!

In case you missed the National Pickle Packers Convention, here are the facts. The three interchangeable units are:

Slidewire Receivers—for potentiometer and resistance bridge applications.

Differential Transformer Receiver—for recording flow, level, pressure, temperature or input motion, using standard Hays transmitters. Sensitivity here is rather impressive, even to a pickle-packer . . . ±0.1% of transmitter differential transformer core motion.

As displayed at the National Pickle Packers Convention.

Mechanical Receivers—for direct recording of pressure and temperature using bellows, bourdons and gas-filled temperature system.

We also have a number of accessories for each electronic receiver. These range from adjustable switches and retransmitting slidewires to 300° indicators and retransmitting differential transformers. A maximum of two integrators or two pneumatic transmitters or controllers can be hung on the chart plate.

To show how this bric-a-brac can be combined, let's start with a flow receiver with slidewire, add a differential temperature (resistance bulb) receiver with slidewire, feed outputs of these two slidewires into another slidewire receiver, throw in an integrator, and *voila!* . . . a BTU Recorder with flow record and integration plus Delta T record and BTU record—all in one case. Interested? We'll send you details.

Hays' Give-Away Department

- Universal Recorder Bulletin, 57-1190-47
- Universal Recorder Specification Sheet, 58-1223-41
- Universal Recorder Bank Carton

Phil A. Sprague

President

THE HAYS CORPORATION • MICHIGAN CITY 2, INDIANA

Circle 1768 opposite last page

two units. Primary connections are compactly arranged between breaker and transformer terminals. Low-voltage terminals are completely accessible.

(Transformer-breaker package is built by Westinghouse Electric Corp., Box 2278, Pittsburgh, Pa.)
Circle 1769 opposite last page.

Remote control assembly for multi-speed drives

Precision control assembly for variable-speed drives from 1/12 to 3 hp can be panel-mounted at convenient remote location.

Permits accurate remote speed setting as required for machine tool feeds, feeder and pump rate settings, proportioning controls. Speeds from

Variable speed drive control mounts easily on machine

any desired maximum to zero and into full reverse can be set. Control permits setting to one part in 4000.

Control assembly is equipped with flexible cable in standard lengths to 6 feet. For greater lengths, sections of flexible cable are used with a solid rod extension.

(Remote control assembly for variable-speed drives is a product of Graham Transmissions Inc., Menomonee Falls, Wis.)
Circle 1770 opposite last page.

Breakers designed for heavy-duty service

New heavy-duty circuit breakers may be used as panelboard main breakers, in power panels, switchboards, motor controls, bus duct plugs, and individual enclosures.

Breakers have interchangeable trip units with continuous current ratings of 125 to 800 amps. Interrupting ratings are 50,000 amps at 240 volts, 35,000 amps at 480 volts, 25,000 amps at 600 volts, ac: and 20,000 amps at 250 volts, dc.

Extra trips, switches may be internally mounted

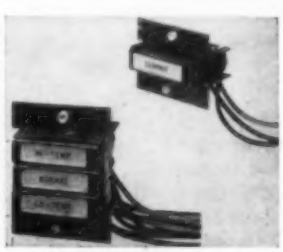
LM breakers are interchangeable with either L or M frame circuit breakers in previous line.

(LM heavy duty circuit breaker is a product of I-T-E Circuit Breaker Company, Small Air Circuit Breaker Division, 19th and Hamilton Sts., Philadelphia 30, Pa.)
Circle 1771 opposite last page.

Miniature annunciator smaller than a thumb

Midget static switching circuit annunciator fits in 1-2/3-inch by ½-inch panel. Small indicator has all circuit elements necessary to function as a regular annunciator.

Tiny size plus fact that annunciator needs no remote actuating devices cut installation costs. Ideal both in con-



Tiny annunciators operate on 24 volts ac power supply

ventional annunciator applications and in computer consoles, data handling systems, and graphic panels with individual flow-line mounted indicators.

Annunciators can be used alone or in multiple installations up to 12 units high.

Midget annunciator alarm system has no moving parts — so no circuit elements in indicator require replacement. Nameplate and lamp housing hinge open for easy bulb replacement.

(Model ST-AM miniature annunciators are a product of The Scam Instrument Corp., 1811 W. Irving Park Rd., Chicago 13, Ill.)
Circle 1772 opposite last page.

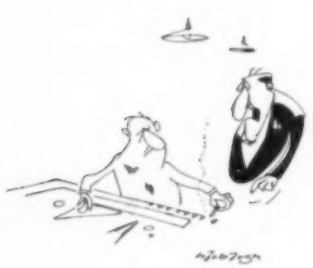
Three-way pump handles clean or gritty fluid

Triple discharges on sealess gusher pump may be used one at a time, all at once, or in combination.

Pump has no seals or metal-to-metal contacts. Ideal both for clean coolants or for liquids containing grit and abrasives.

Pump is available in two lengths. Handles heads up to 30 feet and capacities to 30 gpm. Motor sizes are 1/10 hp, 1725 rpm; or ¼ hp, 3450 rpm.

(Sealess Gusher Pump, Model 5P-4521, is built by The Ruthman Machinery Co., Cincinnati 2, Ohio.)
Circle 1773 opposite last page.



"Why not use the same cigarette burn each time?"

NOW is the time to REDUCE COSTS

COSTS CAN BE REDUCED IN SEVERAL WAYS ELECTRICALLY

Higher voltage distribution transmits more current for light and power with smaller lines more efficiently, and provides better voltage regulation.

The installation of SORGEL dry-type transformers at load centers to step down the current to utilization voltage, will reduce wiring costs because shorter secondary feeders can be used — in new buildings or modernization projects.

ALL Sorgel dry-type transformers are so quiet that they are adaptable for any indoor installation — in institutional, commercial, and industrial buildings. They do not require fire-proof vaults, nor any other enclosures.

Available in all standard and intermediate ratings, ¼ to 3000 Kva, 120 to 15,000 volts.

SORGEL transformers, either dry-type or Askarel-cooled, are also incorporated in substations. They are procurable with any type or make of switchgear, and from any substation manufacturer.

Electric power for various manufacturing processes can be regulated and controlled more efficiently with SORGEL saturable reactors. Any amount of A.C. power from 1 Kva to 3000 Kva, single phase or 3-phase, at any voltage, can be controlled, regulated, and varied in stepless increments, either automatically or manually.

The control can be a small manually operated hand wheel that can be placed in any desired location, or the power can be automatically controlled, regulated and varied by a thermostat or any other instrument or device.

Some typical applications for SORGEL saturable reactors are: controlling and regulating the temperature of electrical furnaces, ovens, metal melting, glass melting, heat treating, dimming incandescent and infra-red lamps, and various chemical processes.

SORGEL saturable reactors are designed to meet your exact requirements. Let us know what your requirements are, and we will submit our recommendations with complete information.

100 Kva single phase dry-type transformer

For more information contact the Sorgel Electric Company, or consult the classified section of your telephone directory for our nearest sales engineer.

SORGEL TRANSFORMERS

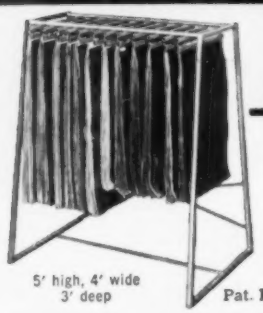
150 Kva saturable reactor with recording and indicating instruments to automatically control the temperature of the heat treating equipment.

SORGEL ELECTRIC CO., 841 West National Avenue, Milwaukee 4, Wisconsin

40 years' experience in the development, manufacturing and application of transformers

Circle 1774 opposite last page

Holds 1800 Blue Prints



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3' deep

Pat. Pend.

for QUICK filing

Glider

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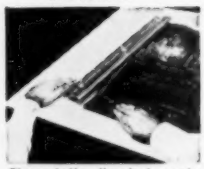
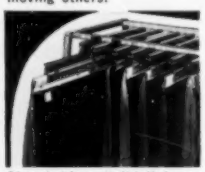
for: CONTRACTORS, ENGINEERS
ARCHITECTS, DRAFTSMEN
FACTORIES



Through the direct clamp design of plan holders, you slip sheets, either singles or sets, in or out without removing others.



Plan holders "glide" in on steel tracks, are secured from end-to-end, and "glide" out with little effort.

Created for savings in filing space, time and effort, Gliders are available for print widths of 20" to 48". Gliders obsolete peg-type filing and hole-punching.

Your prints "glide" into place. Plan holders are retained from end-to-end, with no chance of bending or springing. Eye-easy indexes provide you with rapid reference.

All-steel Gliders, finished in a handsome grey, harmonize with modern office equipment. Extensions are available.

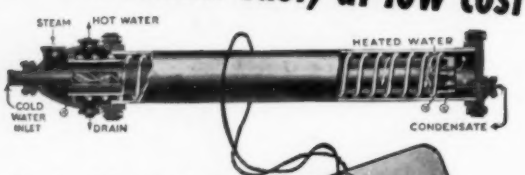
For longer print "life" and for efficiency, durability and economy in vertical filing, specify Glider. Order now through the best office suppliers or write for illustrated literature.

MOMAR INDUSTRIES 4323 West 32nd St. Chicago 23, Ill.

Circle 1775 opposite last page

STEAMLINED!

to heat water fast, at low cost



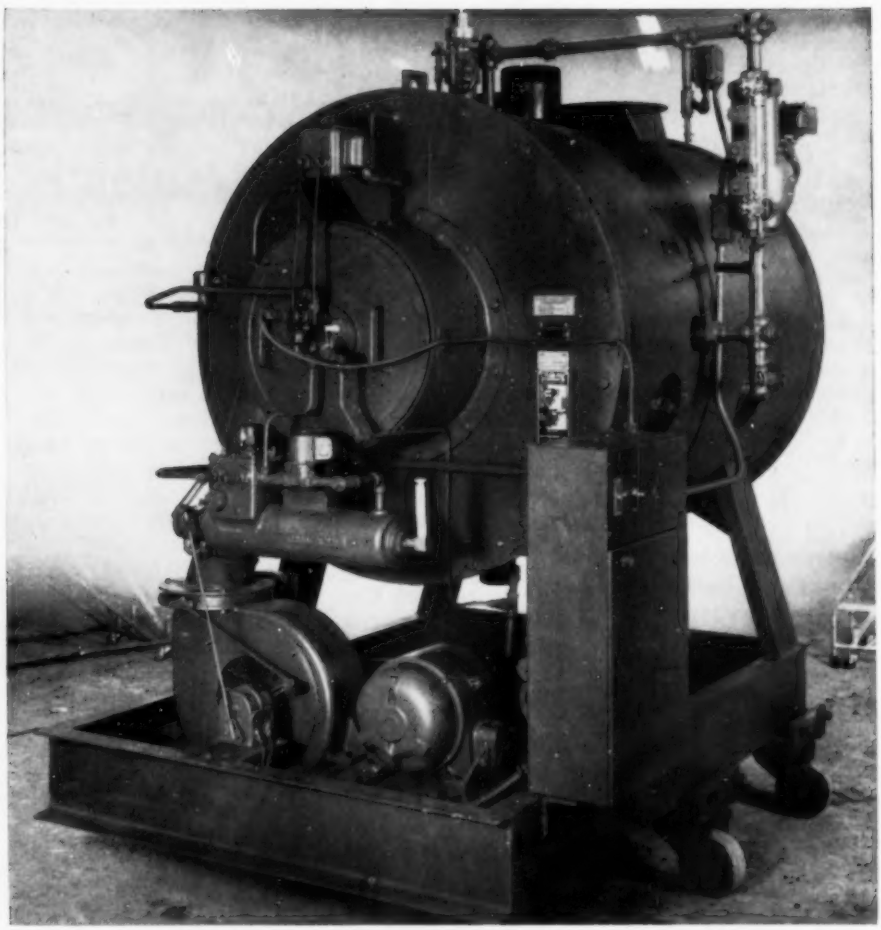
In the Johnson Heater, water to be heated is routed first inside, then outside, a blanket of live steam. It's full pressure steam, too; up to 150 lbs., or 250 lbs. in heavy duty types, no reducers are needed. The result: faster, more efficient heat transfer for a unit of its size. No wonder industry has found so many applications for the Johnson "Instant" Heater, in heating water and process liquids of various types.

JOHNSON "Instant" HEATER

Sizes for all needs; write for literature

The Johnson Corporation
807 Wood St. Three Rivers, Mich.

Circle 1776 opposite last page



Streamlined boiler installs in floor space 4 by 7 feet

Wet-back boiler chamber carries off excess heat

Package automatic boilers rated at 20, 30, 40, and 50 hp supply high- or low-pressure steam or hot water. Boilers burn light or heavy fuel oil, natural or mixed gas, or both gas and oil.

Boiler's wet back — a circular water chamber at rear of boiler — carries off excess heat to permit operation at a higher rating for physical size.

Water-cooled rear head is mounted on a swinging davit and held in place by a single latch. Since all piping to the head is through swivel joints, the head may be opened for inspection and cleaning without disconnecting pipes.

Wet-back design does away with need for much refractory. Also, arch that separates boiler passes is water-backed, eliminating additional refractory.

Boilers have under 100 sq ft of heating surface and less than 3 sq ft of equivalent grate area, so that they can be operated in New York City and Massachusetts without a licensed operator in attendance.

(Wet-back package boilers are built by York-Shipley, Inc., York, Pa.)
Circle 1777 opposite last page.

Designed to CUT MAINTENANCE COSTS

ON PIPE, PIPE JOINTS, CONDUIT, CABLE AND TIE RODS

Depend on

TAPECOAT®

..the Quality Coal Tar Coating in Handy Tape Form

For your preventive maintenance program, you need the best possible protection at the lowest possible cost. Since 1941, TAPECOAT has proved its superiority in combating corrosion. This quality coal tar coating in handy tape form resists the corrosive hazards around power plants, coal hoppers, conveyors, etc. It's self-bonding—easy to apply with use of a torch. No skilled help needed. And it's low in cost considering its quality and continuing protection. Comes in rolls of 2", 3", 4", 6", 18" and 24" widths.

Write for brochure and prices

The TAPECOAT *Company*

Originators of Coal Tar Coating in Tape Form

1531 Lyons Street, Evanston, Illinois

Circle 1778 opposite last page

NEW

USG "A" LINE

INDUSTRIAL PRESSURE GAUGES

WHEN YOU SEE THESE GAUGES, YOU WON'T BELIEVE THE LOW PRICES!

Grade A accuracy . . . quality features at prices up to 40% below premium lines

It will pay you to check specifications of USG's new "A" Line for your plant applications—principally where steam, water and oil pressures must be indicated. Here are the highlights:

- **MEETS A.S.A. GRADE A STANDARDS** —Guaranteed accurate within 1% of scale for middle (working) half of scale—1½% for remainder.
- **WIDE CHOICE OF OPTIONS** — Variety of cases (aluminum standard), mountings, movements, Bourdon tubes . . . dial sizes 3½ to 12 inches . . . pressures to 10,000 psi.
- **LONG LIFE AND EASY MAINTENANCE**— Built-in features and rugged construction assure maximum life with minimum maintenance.

You'll have to see the new "A" Line gauges to believe all the quality features and options offered at amazingly low costs. Ask your U.S. Gauge distributor for a demonstration today, or write for a copy of new Catalog 305.

Find Your Nearest Distributor in The "Yellow Pages"

UNITED STATES GAUGE USG

DIVISION OF AMERICAN MACHINE AND METALS, INC., SELLERSVILLE, PA.

Circle 1779 opposite last page

Neat hydraulic governor uses engine lube oil

Compact, lightweight hydraulic governor is designed for variable or constant-speed service. Unit uses engine lube oil as the pressure medium at a minimum input

Work capacity of compact governor is 12 in.-lb.

pressure of 5 psig.

Provides immediate response to load change on gasoline or diesel generator sets, engine-driven compressors, engine-driven arc welders, marine engines, hoists, bulldozers. Regulates within ¼% steady-state operation.

Unit weighs 10½ lbs, has an overall height of 6⅛ in. with optimum operating speed of 2400 rpm.

(Hydraulic governors are a product of Farris Pickering Governor Company, Palisades Park, N. J.)

Circle 1780 opposite last page.

Place concrete slurry with compressed air

Placement of structural concrete using compressed air as motive power is now possible. Concrete placers handle mixtures with from 2-in. to 6-in. slump, and also will han-

25-foot vertical lift is handled easily

Remember

May . . . . heat's on the way!
June . . . . not too soon!
July . . . . stand by!
August . . look out!

Solve cooling problems this month

COOL MEN, MATERIALS AND MACHINES WITH

"HY-V®" AIR JETS

HERE'S A FAN that pinpoints a stream of cooling air as far as 71 feet with velocities up to 5780 FPM and *without ducts*. Mounts out of the way on ceiling, column or floor stand. Quickly adjusts left or right, depresses to 15° for accurate location of air stream.

"HY-V" Air Jets reduce heat fatigue and keep production high at hot spots during summer months. Air quenching, and ladle and machinery cooling are jobs for these fans, too.

Order now and beat the HOT WEATHER SLOW-DOWN!

FOR FURTHER INFORMATION SEE OUR CATALOG IN SWEET'S PLANT ENGINEERING OR INDUSTRIAL CONSTRUCTION FILES OR WRITE FOR COPY

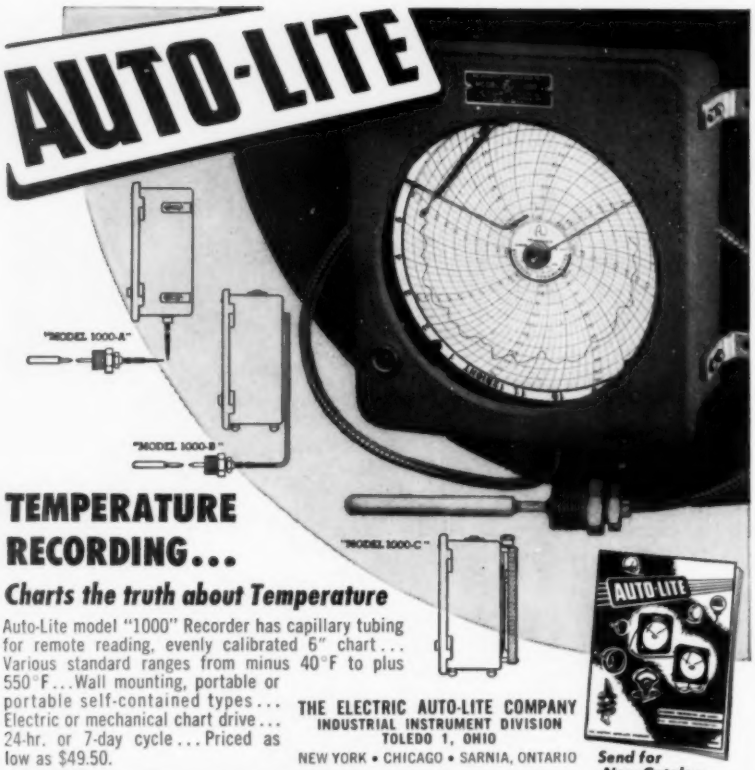
De Bothezat® FANS

A DIVISION OF

American Machine and Metals, Inc.

EAST MOLINE, ILLINOIS

Circle 1781 opposite last page



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Charts the truth about Temperature

Auto-Lite model "1000" Recorder has capillary tubing for remote reading, evenly calibrated 6" chart... Various standard ranges from minus 40°F to plus 550°F...Wall mounting, portable or portable self-contained types... Electric or mechanical chart drive... 24-hr. or 7-day cycle... Priced as low as $49.50.

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INDUSTRIAL INSTRUMENT DIVISION
TOLEDO 1, OHIO
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Send for New Catalog

TEMPERATURE RECORDERS AND INDICATORS

Circle 1782 opposite last page

Boiler Tube Service

fast
— call these representatives
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CLEVELAND Boiler Tube Co. of America Yellowstone 2-6105
CHICAGO Boiler Tube Co. of America State 2-7955
PHILADELPHIA Raphael Paul Lombard 3-7700
LOS ANGELES Fred S. Renauld & Co. Pleasant 2-6181
TAMPA John D. Homan Tampa 65-7211
ATLANTA E. W. Harbour (College Park) Fairfax 1374
ROANOKE J. J. Bower Roanoke 6-3474
NEW ORLEANS Factory Sales & Engineering Canal 9151
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SAN JUAN, P.R. F. A. Ortez & Co. 2-4934
5

BOILER TUBE COMPANY OF AMERICA

McKEES ROCKS, PA. (Pittsburgh District) Federal 1-7750

Circle 1783 opposite last page

dle harsh aggregates, which normally cannot be pumped with standard pumping equipment.

Portable equipment receives concrete directly from mixer.

Two models are available, handling 10 cu ft and 15 cu ft per charge. Either 4-in. or 6-in. ID placement tubing can be used depending upon rock size to be handled. New equipment eliminates need for concrete buggies and other placement equipment.

(Concrete placement equipment is a product of Air Placement Equipment Co., 1009 West 24th Street, Kansas City, Mo.)

Circle 1784 opposite last page.

Blow-off bean valve keeps water pure

Continuous boiler blow-off bean valve removes predetermined amount of water from near surface of boiler water.

Valve removes impurities from boiler water at same rate they are introduced. Keeps boiler cleaner, gives cleaner steam, stops foaming and carryover, and reduces scale formation.

Exact amount of continuous blow-off is specified by company at time of installation.

Bean valve installs easily — six calibrated orifices in graduated sizes make it possible to change or regulate flow according to need.

Comes in two sizes: standard for boilers to 300 psi; large for boilers to 650 psi.

(Continuous blow-off bean valve is a product of The Uniblow Valve Co., 1920 West 77th Street, Cleveland 2, Ohio.)

Circle 1785 opposite last page.

Annunciator monitors complex operations

Annunciator uses static-magnetic controls instead of precision relays to monitor complex automatic systems. With no moving parts, controls give extra reliability for monitoring critical operations or conditions. Ideal in industrial systems where interlock

When the PRESSURE is on...

WILCOX Self-Sealing GASKETS *HOLD*

The greater the pressure, the tighter it holds. Nothing can beat this Wilcox Self-Sealing Gasket as proved in years of service.

The U-shaped metal outer cover is packed with a resilient filling (usually rubber or asbestos). Pressure exerted on the elastic filling forces it into the cover, putting force against the adjacent flange surfaces. Thus, pressures that tend to blow ordinary gaskets make the Wilcox tighter.

Available with covers of copper, lead, tin, aluminum, monel, stainless steel, etc., in all sizes, standard or special.

Write for Bulletin No. 569 and prices

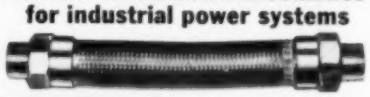
CHICAGO-WILCOX MFG. CO.

7725 South Avalon Avenue
Chicago 19, Illinois

Circle 1786 opposite last page

COBRA® FLEXIBLE SEAMLESS METAL HOSE

Custom constructed assemblies for industrial power systems



All sizes in bronze, stainless or carbon steel, monel, inconel and low carbon nickel. Seamless spiral or parallel corrugation... Braided. All type of fittings and flanges welded, brazed or soldered. Also, interlocked hose.

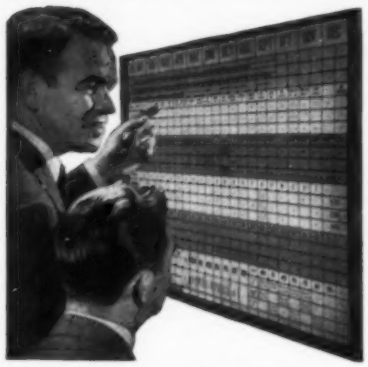
write — wire — phone: RE 7-3311
...for prices and catalogs

COBRA METAL HOSE

5059 S. Kedzie Ave. • Chicago 32, Ill.

Circle 1787 opposite last page

You Get Things Done With Boardmaster Visual Control



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★ Facts at a glance — Saves Time, Saves Money, Prevents Errors
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GRAPHIC SYSTEMS

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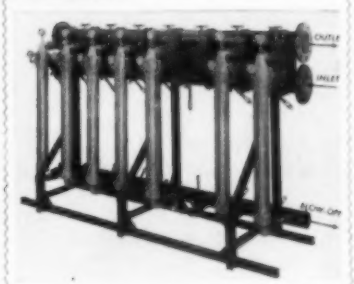
Circle 1788 opposite last page

RONNINGEN COST-CONSCIOUS FLUID FILTERS



1. Ronningen Model 208 Multiplex Filter (shown above) with 1 unit removed from line for service—and all the others can continue to operate.
2. All are Quick Coupling—Non Short-Circuiting. Sealed both ends. Each unit can be back washed and blown down in 5 seconds.
3. Heavy reinforced inner assures 150 PSI "dead short" without collapse.
4. Bronze and copper construction; also all 316 stainless steel; also all steel.

10-1600 GPM. Pressures to 300 PSI. Write for Bulletin 954P

STRAIN AGAIN WITH RONNINGEN

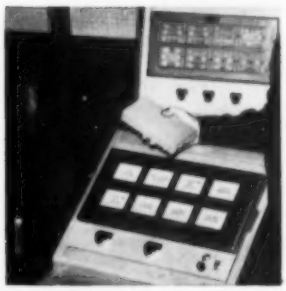
"Particles large or small, we filter them all"

RONNINGEN-PETTER CO.

Vicksburg, Michigan Phone Midway 5-5161

Representatives throughout U. S. and Canada

Circle 1789 opposite last page



Sequence is changed quickly by plugging in required units

or automatic shut-down are involved.

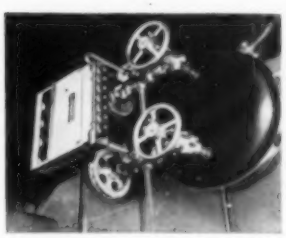
Annunciator warns of off-normal occurences on an instrument panel. Plug-in design of static-magnetic elements permits changing sequences without rewiring.

(Static-magnetic annunciator was developed by Panellit, Inc., 7401 North Hamlin, Skokie, Ill.)

Circle 1790 opposite last page.

Only two welds needed for package water gage

Installation of this completely welded assembly requires only two field welds. Gage is shop tested to full design steam pressure. Locking-type shutoff valves are provided in series with the gage valves. Units are available for 21-in. and 27-in. center-to-center boiler connections.



Gage assembly meets requirements of almost any installation

Gage package is available with Multi-Port gage for operating pressures above 900 psi. Bi-Color gage shows steam as red and water as green.

(Gage package is a product of the Diamond Power Specialty Corporation, Lancaster, Ohio.)

Circle 1791. ◆

ROTOJET

The modern TUBE CLEANER

Fast • Powerful • Efficient

Only ROTOJET Tube Cleaners offer the simple, efficient, time-tested Rotocentric design. A single paddle maintains contact with the cylinder wall without depending upon centrifugal force. Motor won't stall at low speeds caused by heavy loads. Positive starting is assured with Rotojet motors driven by air or steam.

Rotojet water-driven Tube Cleaners are comparable in speed and power with air-driven types.

Send for bulletin showing motors, heads, and brushes for straight and curved tubes and pipes from ½" to 12" I.D.

Section of ROTOJET pneumatic motor showing simple design.

PNEUMATIC

Model C-525 ROTOJET Air-driven Motor with swing frame head and universal coupling for 2¼" to 3½" I.D. curved tubes.

Model S-530 ROTOJET Air-driven Motor with swing frame head for 3¼ to 3-13/16" I.D. straight tubes.

Model C-526 ROTOJET Air-driven Motor with single pin head and universal coupling for 1¼" to 2½" I.D. curved tubes.

Model C-434 ROTOJET Junior Air-driven motor, flexible holder, expanding brush.

HYDRAULIC

Model C-322 ROTOJET Water-driven Motor with 3-arm head and universal coupling for 2¼" to 2½" I.D. curved tubes.

Model S-360 ROTOJET Water-driven Motor with combination drill head and universal coupling for 2¼" to 3½" I.D. straight tubes.

Model C-321 ROTOJET Water-driven Motor with short 4-arm head and universal coupling for 2½" to 3" I.D. curved tubes.

ELLIOTT COMPANY—ROTO PLANT

Tube Cleaner Specialists Since 1910

151 Sussex Avenue, Newark, N. J.

Circle 1792 opposite last page

NEW LITERATURE

Reviews of books and industrial bulletins describing equipment, supplies, services

Ceiling controls light, air flow, noise level

Bulletin tells how luminuos ceilings improve light diffusion, aid sound absorption, and regulate air flow. Ceilings consist of thin corrugated plastic sheets suspended below light source. Perforated steel baffles attach to channels holding the ceiling.

Baffles contain glass-fiber sound-absorption pads. Plenum chamber above ceiling may serve as air supply source or for exhaust. Conditioned air may be distributed without grills or diffusers.

Bulletin shows how system is installed. Describes maintenance of luminous ceiling. Gives six easy steps for planning a luminous ceiling layout.

(Bulletin "The Ceiling That Works For You", 16 pages, is published by Luminous Ceilings Inc., 2500 W. North Ave., Chicago 47, Ill.)
Circle 1793 opposite last page.

Decentralized steam — A case history

Case history tells how W. P. Fuller & Co. saved space, installation and operating costs, and shutdown time by replacing old boiler with decentralized units.

Bulletin describes complete installation, tells how six steam generators were installed for less than cost of replacing and repairing existing steam mains.

(Case History 108, 4 pages, is available from Clayton Manufacturing Co., El Monte, Calif.)
Circle 1794 opposite last page.

Automation — pitfalls for management

What new problems will management be asked to solve with the added complexities of automated production? Should the entire plant operation be automated? How will this affect the pay roll, the sales department, the company's product?

In an attempt to find answers to some of these questions, Harvard Business School is studying automation and its effect on production.

The study begins with background data on automation and the degree of automation advisable. It surveys automation programs in 13 plants and summarizes typical problems encountered in setting up automation programs.

Other problems covered include effect of automation on production, on the work force, on the sales program, and on management.

("Automation and Management," by James R. Bright, 270 pages, $10.00. Order from Division of Research, Harvard Business School, Soldiers Field, Boston 63, Mass.)

Power distribution units are 'shelf-engineered'

Power distribution systems for 3- and 4-wire, 600-volt service, are described in bulletin. Standard, "shelf-engineered" components simplify system design and installation by eliminating need for specially engineered busway components.

(Bulletin 10 describes standard components, plugs, tees, elbows, hangers, flexible connectors. 24 pages. Electric Distribution Products, Inc., 2210 31st St., S.W., Allentown, Pennsylvania.)
Circle 1795 opposite last page.

Service manual reviews transformer use, care

Comprehensive transformer service manual for operating and maintenance personnel in utilities and industries covers every phase of transformer know-how. Subjects include transformer use, construction, industry standards. Manual is fully illustrated.

Transformer manual's 150 pages (page size: 4½ by 7 inches) are in loose-leaf ring binder. New data will be furnished automatically as needed to replace outmoded information or to cover new transformer trends.

(Transformer service manual may be obtained by letterhead request direct to Allis-Chalmers Manufacturing Co., Milwaukee 1, Wis. A slight charge is made to cover cost of keeping material current.)

Engineering specs show liquid-flow controller

Bulletin describes controller specifically designed to maintain uniform filtration rate through each filter unit in filter system.

Bulletin includes chart of controller capacities, dimension and installation data, complete engineering specifications.

(Ten-page Bulletin 900 is issued by Simplex Valve & Meter Co., 7 E. Orange St., Lancaster, Pennsylvania.)
Circle 1796 opposite last page.

Design globe valves for high pressures

Valve periodical describes design and construction of new high-pressure high-temperature globe valve for new 450,000-kw generating station at Linden, N. J. Includes other articles on new valve trends.

(Twelve-page "Valve Values" No. 46 is issued by Edward Valves, Inc., Rockwell Manufacturing Co., 1201 W. 145th St., East Chicago, Indiana.)
Circle 1797 opposite last page.

Cooling tower controls up tower efficiency

Bulletin reviews basic cooling tower theory. Explores instrumentation necessary for efficient operation.

Describes experimental cooling tower — the first of its size to have controlled air inlet conditions. Experimental tower can be equipped with any amount and kind of deck filling to its maximum height. Aids in determining performance characteristics of various types of deck filling.

(Bulletin "From the Top of the Deck," 8 pages, is available from J. F. Pritchard & Co. of California, 4625 Roanoke Pkwy., Kansas City, Missouri.)
Circle 1798 opposite last page.

Tips on selecting insulated cable

Tips for electrical cable buyers are given in pocket-size bulletin. Cartoon-style illustrations supplement text. Checklist shows typical technical points to be covered when specifying an electric cable circuit.

(Bulletin 117, 20 pages, is available from The Okonite Co., Passaic, N.J.)
Circle 1799 opposite last page.

Valve engineering data for all quench jobs

Installation arrangements, parts lists, and dimensions are given for coke quenching valves and drain valves. Bul-

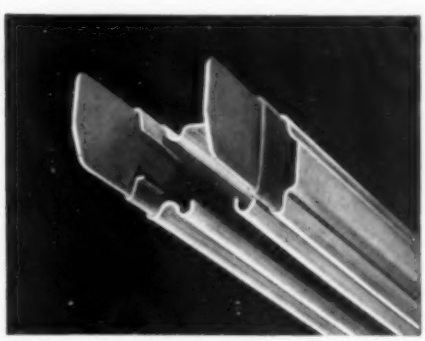
For more information on product at right, circle 1800 see information request card opposite last page.

New Universal Lighting System—

for flexible, low-cost lighting

Here's efficiency and economy, too. BullDog's new 20-amp Universal Lighting System both feeds and supports lighting fixtures . . . requires no supplementary fusing. Fixtures can be positioned at any spot throughout the entire system . . . are quickly and easily moved to meet changes in lighting requirements. No rewiring or electrical downtime, either.

Listed by Underwriters' Laboratories, this new Universal Lighting System assures maximum flexibility at minimum cost. Check its many advantages. Consult your electrical contractor or BullDog field engineer. Or write BullDog Electric Products Co., Detroit 32, Michigan. © BEPCO



CROSS SECTION of new, low-cost 20-amp Universal Lighting System. Movable weight supports and twistout plugs speed rearrangement, addition or removal of fixtures, eliminate rewiring and electrical downtime.

BULLDOG

BullDog Electric Products Company, Division of I-T-E Circuit Breaker Company, Detroit 32, Mich. *BullDog Export Division:* 13 East 40th St., New York 16, N.Y. *In Canada:* BullDog Electric Products Co. (Canada) Ltd., 80 Clayson Rd., Toronto 15, Ont.

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Sold thru distributors everywhere
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Circle 1801 opposite last page

the MURPHY 2569

SEPARATOR
does a smooth job of
SEPARATING and EJECTING
water, oil, scale, and rust from
COMPRESSED
AIR LINES
YOU SHOULD HAVE FULL INFORMATION
Write now for FREE Data Sheet No. 2569
JAMCO
JAS. A. MURPHY & CO., INC.
1419 EAST HIGH STREET, HAMILTON, OHIO

Circle 1802 opposite last page

NEW LITERATURE

letin tells how quenching and drain valves are used for any type of quenching, for remote control station, in water cooling line to furnace or dies — wherever rapid operation with cushioned closing is desired.

(Bulletin W-15, 4 pages, is available from Golden-Anderson Valve Specialty Co., 1232 Ridge Ave., Pittsburgh 33, Pennsylvania.)
Circle 1803 opposite last page.

How to heat feedwater in less space

Describes open coil tray-type feedwater heaters guaranteed to heat water to a higher temperature in less space than any other heater. Covers deaerating and non-deaerating heaters with capacities from 3000 to 300,000 lb/hr.

Bulletin gives data on heater applications, ratings, operation. Explains counterflow principle and vent condenser function.

(Bulletin 117-A, 12 pages, is available from Stickle Steam Specialties Co., 2215 Valley Ave., Indianapolis 18, Ind.)
Circle 1804 opposite last page.

How to save with cable supports

Data file gives information on how cable trough cuts purchase, installation, and maintenance costs in electric distribution systems. Two case histories are cited to illustrate savings.

(Six pages. Data File 31-C-74 is issued by T. J. Cope Div., Rome Cable Corp., Collegeville, Pennsylvania.)
Circle 1805 opposite last page.

Automatic systems for combustion control

Bulletin describes 10 pre-assembled package combustion control systems for steam generation equipment. Package system is a completely piped and wired free-standing control panel of ¼-inch steel.

Panel has all instrumentation and controls necessary for

NEW FLOOR PATCH

A new chemical-resistant, high-strength patching material that can be applied to concrete floors without preliminary surface preparation is now available from The Garland Co., Cleveland 5, Ohio.

Known as Chemi-Patch, it bonds tightly to concrete without requiring prior chipping or cutting around the area to be repaired. Light wire brushing to remove dirt and loose particles provides complete assurance of proper adhesion.

Chemi-Patch forms a durable, non-slip surface with 3 times the compressive strength of concrete. It is unaffected by hydrochloric, lactic and acetic acids as well as urea solution and ammonium hydroxide. It also is resistant to salts, petroleum products, vegetable and fruit sugars, oils and caustics.

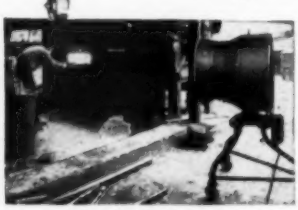
Easily troweled on, Chemi-Patch can be applied in ⅛-inch layers and can be feather-edged. It is ready for light traffic in 18 hours and heavy steel wheel trucking in 36 hours. Available in handy 2½-gallon containers.

For additional information, request bulletin CP-1, The Garland Co., Cleveland 5, Ohio.

Circle 1806 opposite last page

For Man-Cooling!

Coppus Airplane Type Heat Killer®
cools large areas — restores efficiency



HEAT KILLER on the job in drop forge plant.

Steel mills, drop forge plants, foundries and other plants with hot working conditions find this Coppus Heat Killer increases worker efficiency . . . at reasonable cost. *A single fan cools large areas.*

Other types also available for cooling furnaces, electrical equipment, for driving out gases, drying out products, drawing out fumes. Write now for detailed information. COPPUS ENGINEERING CORPORATION, 185 PARK AVENUE, WORCESTER 2, MASSACHUSETTS.

ANOTHER
COPPUS
"BLUE RIBBON" PRODUCT

Circle 1807 opposite last page

fully automatic operation of single burner gas or oil-fired boilers.

Bulletin contains schematics, program control chart, component details, panel outline and components drawing, piping, and wiring details.

(Bulletin 57-1088-239, 12 pages, is published by The Hays Corp., Michigan City, Indiana.)
Circle 1808 opposite last page.

Magnetic O_2 system for steam plants

Application data sheet describes magnetic 0_2 system for flue gas analysis. System may be used with single- or multi-fuel firing.

Includes data on system components. Case history tells how system is used in twin-furnace boiler of large utility company.

(Four-page Data Sheet 463-60 is issued by Leeds & Northrup Co., 4934 Stenton Ave., Philadelphia 30, Pa.)
Circle 1809 opposite last page.

Comparative data about protective coatings

Sixteen-page bulletin gives comparative data on protective coatings, including drying times, coverage and surface preparation, refinishing cycles. Describes chemo-setting synthetic resin protective coating that cures both by solvent evaporation and internal polymerization.

(Bulletin MS-57 is available from Mono-Seal Products, Everett 49, Mass.)
Circle 1810 opposite last page.

Manual on connectors for overhead lines

Comprehensive, fully indexed 100-page manual contains handy chart to help you select connectors for specific applications.

Manual covers service connectors, repair sleeves and taps, aerial cable, tooling and accessories. Gives complete specifications on copper and aluminum and ACSR conductor, clamps, compression taps, splices, deadends, and adapters.

Tables give physical properties of various types of cable.

(Catalog 57 is published by Burndy Corp., Norwalk, Conn.)
Circle 1811 opposite last page.

Data, specs cover plugs, connectors, receptacles

Technical data in bulletin include wire tables based on excerpts from 1956 code and dimension tables for electrical connectors. Bulletin gives complete engineering specifications on Series W connectors to Mil-C 5015-C performance requirements, Series C connectors for NEC circuit breaking, Series S connectors to Mil-E 5272, and Series CS connectors built to Mil-E 5272 specifications.

Bulletin gives wide choice of pin and socket contact configurations, from 4 poles to 100 poles, for both Series W and Series C.

(Bulletin 1252-1, 62 pages, is published by Pyle-National Co., 1334 N. Kostner Ave., Chicago 51, Ill.)
Circle 1812 opposite last page.

Precise instruments give true rate-of-flow control

Bulletin describes precision instruments for measuring, indicating, recording, and controlling fluid rate of flow. Includes detailed engineering data on rotameters and flow indicators for normal and special applications.

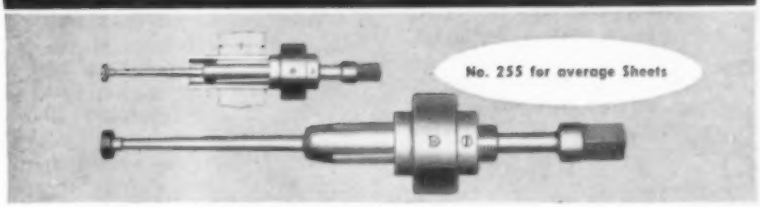
(Bulletin M-1, 4-pages, is issued by Instrument Div., Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.)
Circle 1813 opposite last page.

How to calculate that pipe heater size

Pocket-size folder gives tables to aid in calculating correct pipe heater length for various applications. Tells how electric pipe heater can be

IDEAL

WIEDEKE Precision-Built Tube Expanders



Ball Bearing Adjustable Thrust Collar Tube Expanders are made for Tubes ¼" diameter and larger.
Recommended for use with any Controlled Rolling Motor for uniform expansion of Tubes.

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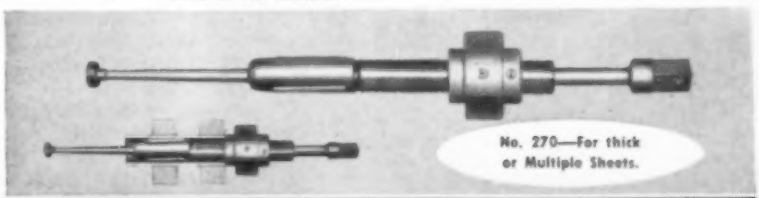
For Rolling—Heat Exchanger, Condenser and other Heat-Transfer Tubes.



THE GUSTAV WIEDEKE COMPANY
DAYTON 1, OHIO

Circle 1814 opposite last page

To get more information on products—use the Reader Service Card . . . *opposite last page*

match power factor correction to the motor

with
UNIPAK CAPACITORS*

It's easy with Sprague's *complete selection* of designs in sizes from ½ to 15 KVAR. Each is completely self-contained . . . needs no additional switches or fuses. Unique Sprague unit cell construction gives you maximum reliability, long term trouble-free service.

Write for complete information in Bulletin PF-1150 available free on request to Industrial Capacitor Division, Sprague Electric Co., 351 Marshall St., North Adams, Massachusetts.

The mark of
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reliability

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Circle 1815 opposite last page

installed on pipes or used as an immersion heater in tanks and vats.

(Bulletin on Electrothermal Pipe Heaters, 6 pages, is published by Arthur S. LaPine & Co., 6001 S. Knox Ave., Chicago 29, Illinois.)
Circle 1816 opposite last page.

Deaerator removes corrosive gases

Tray-type deaerator that removes corrosive gases from boiler feedwater is described in bulletin. Deaerators have effluent capacity of 18,000 lb/hr to over 2 million lb/hr.

(Bulletin 28B8853 describes operation cycle, shows six typical storage arrangements, and gives standard tray deaerator data table. 6 pages. Allis-Chalmers Manufacturing Co., 1151 S. 70th St., Milwaukee 1, Wis.)
Circle 1817 opposite last page.

Descaling procedures — case histories

Ten actual case histories give solutions to scale-formation problems encountered in condensers, compressors, steam generators, and cooling apparatus. Scale-removing procedure for each case is explained in detail.

(Kwik-Kleen Case History Folder, 10 pages, is offered by The North American Mogul Products Co., Room 2023 Standard Building, Cleveland 13, Ohio.)
Circle 1818 opposite last page.

Gives sizing data on condensers

Bulletin describes low-level condensers for condensing steam under vacuum at ground level for industrial processes, steam engines, and turbines. Includes application, construction, and operation data on both eductor and multi-jet condensers.

(Bulletin 5AB, 8 pages, is offered by Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.)
Circle 1819 opposite last page.

Handy selection chart on belt finishing

Two-color 15 x 17-inch wall chart gives useful tips on selecting off hand belt finishing materials and equipment. One section of chart pictures 10 belt finishing machines.

Tells applications for which each type is best suited. Second section gives requirements for belt finishing. Gives, in tabular form, material, operation, belt, grit, lubricant, type of contact wheel.

Final section of chart gives data on contact wheels and how they work. Pictures wheel surface and describes hardness, wheel action, applications for each type.

(Belt Finishing Wall Chart is being offered by Behr-Manning Co., Division of Norton Co., Troy, N.Y.)
Circle 1820 opposite last page.

Instant water heaters; How many? How big?

Printed in two colors, this 8-pg bulletin compares instantaneous and storage tank water heaters. Concise but thorough method for determining number and capacity of instananeous heaters is presented. Factors which make instantaneous heaters impractical are also explained. (A water hardness map of the US is included.)

Several typical problems involving dwellings, institutions, industrial and commercial buildings show how the method works.

(Bul IW-34 is issued by Bell & Gossett Co., Morton Grove, Ill.)
Circle 1821 opposite last page.

Industrial hose — how to order

Fully indexed 32-page catalog describes flexible hose, hose assemblies, and couplings for centralized lubrication, fluid power equipment, pneumatic equipment, filtration systems, hydraulic and pneumatic devices, and power units.

Includes tips on hose selection, mounting. Also covers reusable couplings, swivels, hose clamps and stems. Complete engineering specifications are given for each item described.

(Catalog 57 is available from J. N. Fauver Co., Inc., 51 West Hancock, Detroit 2, Michigan.)
Circle 1822 opposite last page.

Charts tell temperatures of water vapor in air

Dalton's Law charts in bulletin indicate percentage of air in a saturated air-water vapor mixture through an extended pressure-temperature range.

Charts are useful in determining total mixture weight or mixture temperature.

(Bulletin M-572 also describes Sweco steam jet ejectors and condensers. 8 pages. Southwestern Engineering Co., 4800 Santa Fe Ave., Los Angeles 58, Calif.)
Circle 1823 opposite last page.

Data on skylights of aluminum, fiberglass

Bulletin gives data on aluminum and fiberglass skylight panels for light and insulation. Bulletin reviews various types available and gives pertinent dimension and installation data on each type. 12 pages.

(Bulletin 12-J is available from The Marco Co., 45 Greenwood Ave., East Orange, N. J.)
Circle 1824 opposite last page.

Offers descriptive data on rack assemblies

Describes single-row, three-row, and cluster-type capacitor rack assemblies. Includes features, ratings, dimensions, data on accessories.

Pole-mounted rack assemblies are rated 300- to 750-kvar at phase-to-phase voltages of 2400 delta to 13,800 grounded wye. Switched or unswitched assemblies available.

(Bulletin PC4, 16 pages, is available from Line Material Industries, McGraw-Edison Co., Milwaukee 1, Wis.)
Circle 1825 opposite last page.

Match high-speed motor to your exact needs

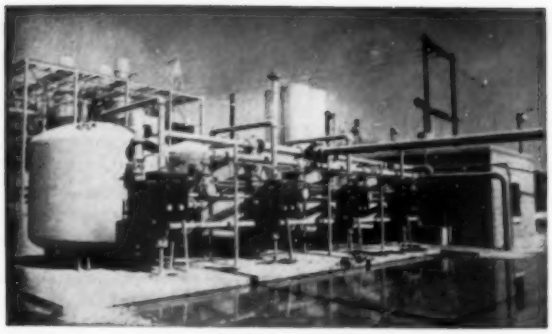
Eight-page bulletin describes vertical and horizontal high-speed synchronous motors for 1500-hp and up (514- to 1800-rpm). Reviews complete engineering service that analyzes your special electrical and mechanical requirements. Determines exact high-speed synchronous motor for your plant's needs.

(Bulletin GEA-6620 is available from General Electric Co., Schenectady 5, N. Y.)
Circle 1826 opposite last page.

Oil bath cleaner traps hard-to-catch particles

Oil bath after-cleaner separates dust from air as it passes through crimped-wire viscous fluid bed pad. Unit's high collection efficiency makes it suitable for tough metalworking dust problems.

(Bulletin 285A gives complete engineering data. 8 pages. American Air Filter Co., Inc., 215 Central Ave., Louisville 8, Ky.)
Circle 1827 opposite last page.



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(for over half a century)

Complete plants for water softening, demineralization, silica removal, de-oiling of condensate, clarification, de-alkalizing and all other requirements.

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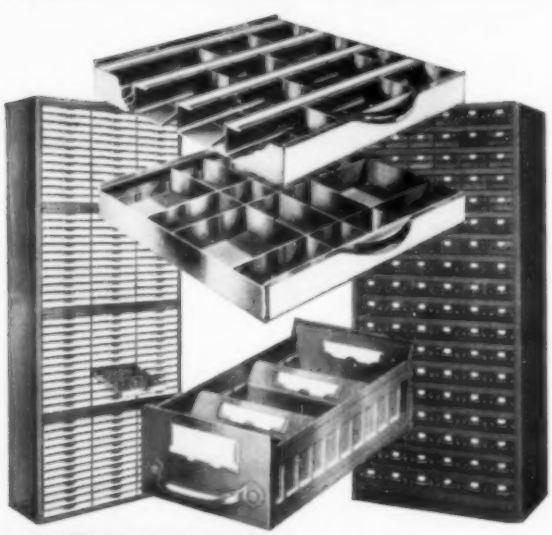
up to 6,184 Drawer Compartments in only 3 sq. ft. of floor space!



Equipto
603 Prairie Avenue
Aurora, Illinois
Write for free catalog No. 206

Circle 1829 opposite last page

NEW LITERATURE

Coal scale alarm sounds when coal supply fails

Alarm system gives automatic protection against coal supply failure in pulverizer or stoker-fired operations. Warning device is not affected by changes in coal supply demand.

Drawings show details of magnetic impulse switch that transmits electrical impulses to control panel without direct mechanical connections.

(Data Sheet 5703 is available from Richardson Scale Co., Clifton, N. J.)
Circle 1830 opposite last page.

Union check valve has nylon body

Two-page bulletin gives data on insertable union check valve with body of 101 grade nylon. Valve installs easily in existing piping. Resilient nylon fins seat tight despite uneveness or angle differences of union faces.

(Bulletin NP-25 is available from Jordan Industrial Sales Div. of OPW Corp., 6013 Wiehe Rd., Cincinnati 13, O.)
Circle 1831 opposite last page.

Do acid cleanings harm boilers, exchangers?

Industry report cites case histories in which permanent power plant equipment has been cleaned repeatedly with chemical cleaners — without damage. Describes system of chemical cleaning to remove scale, sludge deposits.

(Bulletin 1806, 4 pages, is available from Dowell Inc., Box 536, Tulsa 1, Okla.)
Circle 1832 opposite last page.

How to simplify work routine

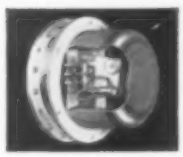
Practical "how-to-do-it" guide for anyone interested in learning how to use work-saving techniques. Can be applied either to one specific routine or as guide to establishing better work routines

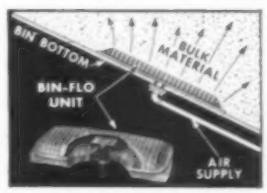
continued on page 38

NEW BIN LEVEL INDICATOR

New ROTO-BIN-DICATOR®
Motor driven paddle-type bin level indicator
For automatic bin level indication or control of bulk materials. Particularly suited to applications on bins subject to pressure or vacuum.
EXPLOSION-PROOF
U. L. listed units available

BIN-DICATOR®
The original diaphragm-type bin level indicator. In successful use for 20 years.





BIN-FLO®
Assures gravity flow of pulverized materials
Bin-Flo Aerator units in bins, chutes, etc., use small volume, low pressure air to restore flow to dry, pulverized materials which tend to pack and bridge in storage.

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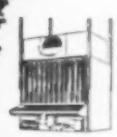
Circle 1833 opposite last page

MODERN HEATING FOR INDUSTRY



Reznor gas heaters offer the efficient, economical answer to all these heating problems:

- complete heating systems for new buildings
- replacement of obsolete heating systems
- supplemental heating for trouble spots
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With suspended, duct and free-standing types in all appropriate sizes from 25,000 to 2,000,000 Btu, the Reznor line includes the equipment which is exactly right for YOUR plant heating job.

For complete details, write today for your copy of Bulletin GN-57 or give your nearby Reznor distributor a call. You'll find him listed under "Heaters-Unit" in the Yellow Pages.

REZNOR
WORLD'S LARGEST-SELLING DIRECT-FIRED
UNIT HEATERS

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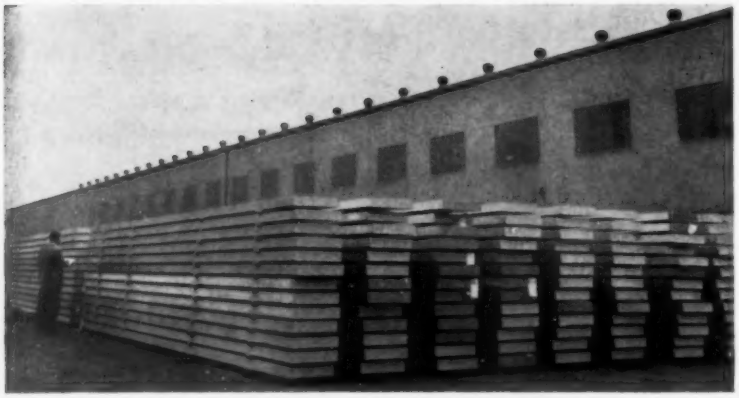
Circle 1834 opposite last page

PHOTO NEWS

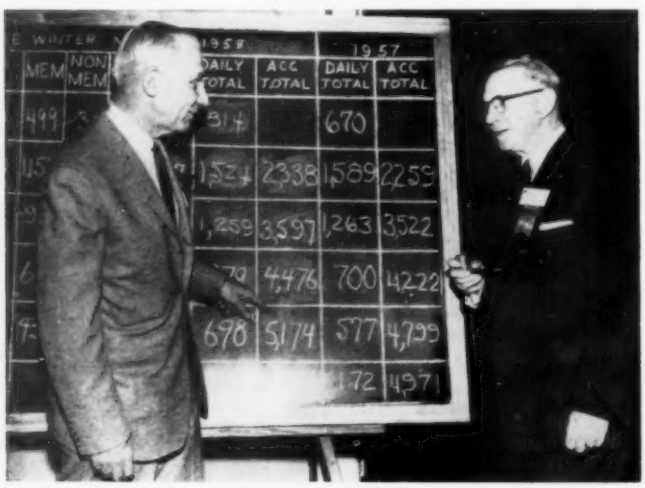


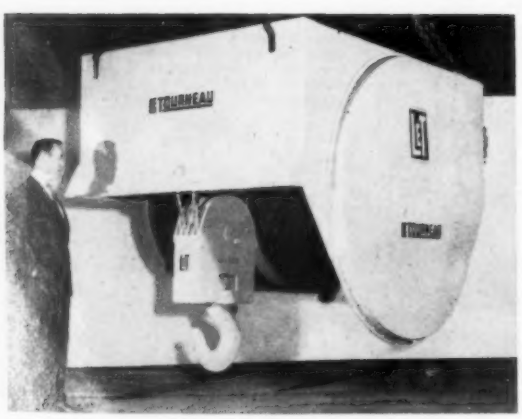
Largest aluminum bus conductor ever extruded is being produced by Harvey Aluminum, Torrance, Calif. for its primary aluminum reduction plant at The Dalles, Oregon. Bus bars measure 4⅛ in. by 20 in. in lengths up to 43 feet. When installed, bus will carry 90,000 to 100,000 amps in each of two circuits serving the hundreds of reduction cells. Extrusion gives better surface finish and higher conductivity than rolling.

The new look in insulation. Prefabricated thermal insulation, sold under the trade name of "Mirror Insulation", handles temperatures in range of −400°F to +2000°F. Technically classified as a "Massless" insulation, it is made up of air spaces partitioned by reflective metal sheets. Normally supplied in aluminum alloys, stainless steels and other high grade alloys may be specified for high-temperature conditions. (Mirror Insulation is manufactured by Mirror Insulation Company, 201 South Main Street, Lambertville, N. J.)

Circle 1835 opposite last page.

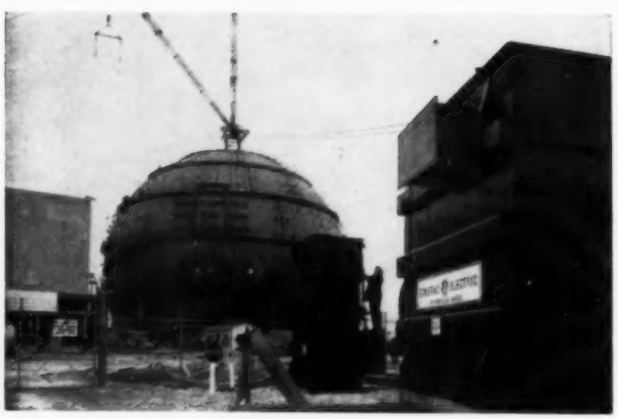
Attendance of 5340 at 1958 AIEE Winter General Meeting in New York was a new record in society's 74-year history. D. M. Quick, general chairman of meeting, and Walter J. Barrett, president of AIEE, inspect daily tally of registrants. Over 400 papers were presented at more than 100 technical sessions and symposiums — another record in this field.





Gigantic hoist, sold to volatile-chemical manufacturer in Pensacola, Fla. has a capacity of 45 tons and lift height of 103 feet. It weighs 16,650 lbs, and cost about $1 per pound. Hoist can raise or lower a full capacity load to within 0.008 inch limits.

Latest look at Dresden nuclear power plant shows that sphere to house reactor is nearing completion. Auxiliary-power-supply transformers, ready for installation, are rated OA/FA, 10,000/12,500 kva. One has a high voltage of 138 kv and other 14.4 kv.



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Guaranteed efficiency of fume and dust collection systems engineered and built by Norblo is obtainable because Norblo Equipment includes automatic bag type, improved centrifugal, and hydraulic types. Your operations may require one of these types — or all three! Norblo can tell you — will engineer the necessary combination to handle your dust and fume collection at most economical cost. More than 40 years experience serving many industries. State your problem so we can send literature on equipment applicable to your needs.

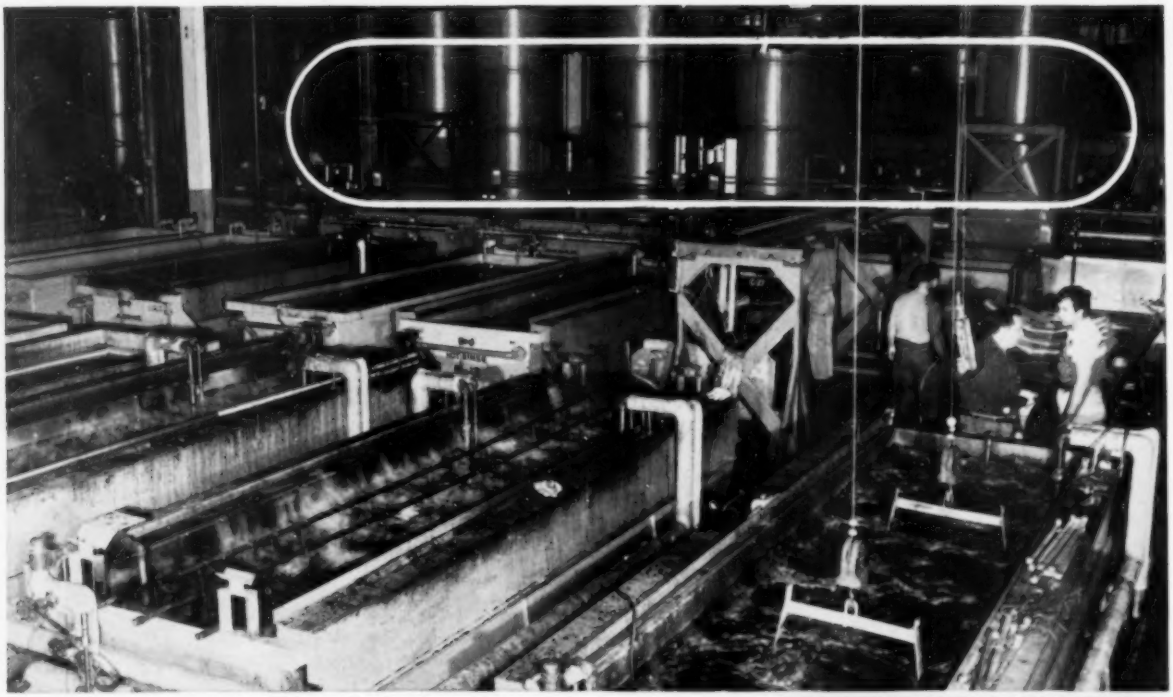
Replacement Bags

Dust Arrester bags do wear out eventually, and it's wise to replace them with the type best suited to your operation. Bags of various materials, made to our specifications, are available from the Norblo factory. Write for our Dust Arrester Bag Bulletin containing information on bag selection, hints for making successful bag repairs, and prices on five types of bags.

The Northern Blower Company
6422 Barberton Ave. • Cleveland 2, Ohio

Norblo
ENGINEERED DUST COLLECTION SYSTEMS FOR ALL INDUSTRIES

Circle 1836 opposite last page



Here's a Unique Answer to a Tough Ventilating Problem . . .

Efficient Plating Tank Exhaust with No Overhead Obstruction

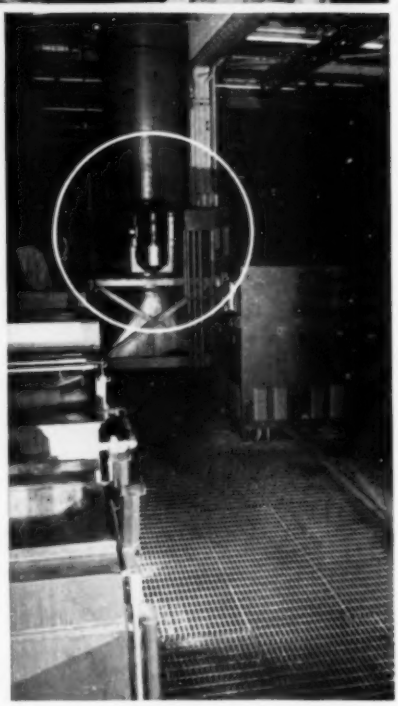
Hartzell High-Temperature Vaneaxial Blowers power this unique plating tank exhaust system at the Stratford, Connecticut plant of Sikorsky Aircraft Division, United Aircraft Corporation.

Use of the lateral slots and sub-floor ducts keeps aisles clear . . . and no part of the exhaust system extends above the tanks to hamper use of cranes in loading and unloading the tanks.

Exhaust of 200 CFM per square foot of tank area is provided with all blowers operating at approximately 2½" WG. Fumes are exhausted vertically through the roof.

Hartzell has the equipment that is just right for almost any industrial air moving job. See your nearby Hartzell field engineer for the details of how Hartzell can solve *your* tough air moving problem.

This installation was handled by the Hartzell field office at 1243 Post Road; Fairfield, Connecticut; phone Clearwater 9-3349.



Why You Can Count on Hartzell Air-Moving Equipment for Long Life, Rugged Reliability and Minimum Maintenance

Hartzell fans and blowers are engineered and built for the exacting requirements of tough industrial service. There's no compromise with quality for the sake of shaving a few dollars on price. Hartzell fans are designed for the industrial buyer who is willing to pay for long life, dependable service and low maintenance.

HARTZELL
PROPELLER FAN CO.
Div. of Castle Hills Corp.
53 Thomas Blvd. • Piqua, Ohio

ENGINEERING OFFICES IN PRINCIPAL CITIES

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NEW LITERATURE

continued from page 35

throughout an entire plant.

Gives advice on possible human stumbling blocks to plant work simplification programs: operators, unions, management, certain individuals.

("Work Simplification," by Gerald Nadler, 575 pages, $7.50. Order from McGraw-Hill Book Co., Inc., 330 West 42nd Street, New York 36, N. Y.)

Data guide gives specs on easy speed control

Describes adjustable speed drives for precise motor control in range from 5 to 200 hp. Speed and tension can be regulated for individual drives or for interlocked multi-motor drives.

Possible applications include machine tools, test stands, conveyors.

(Bulletin 2000 on Select-A-Spede drive, 12 pages, is offered by The Louis Allis Co., 427 East Stewart St., Milwaukee 1, Wis.)
Circle 1838 opposite last page.

For more information on items reported in the New Literature section circle corresponding numbers on reader service card opposite last page.

Order heat exchangers from stock and save

Describes pre-engineered, standardized exchangers that offer special engineering results without special engineering costs. Exchangers are standardized in 46 models. Built in one, two, and four pass designs.

Eight-page bulletin gives construction details; table of standard sizes, dimensions, and weights; and cross section drawings of various models.

(Bulletin 1.1K6 is offered by Ross Heat Exchanger Div. of American-Standard, Buffalo 5, N.Y.)
Circle 1839. ◆

THAT'S INTERESTING

473 coal miners killed in '57 mine accidents

Coal mine accidents killed 28 more miners last year than in 1956, according to U. S. Bureau of Mines. B. of M. Director Marling J. Ankeny calls for help in coping with new mine hazards created by increased mechanization in mining methods.

Deaths from roof falls were down 13 from 1956 toll of 238. Ankeny attributes drop to nationwide safety campaign to cut down roof fall accidents — still biggest single cause of mine deaths.

Underground gas explosions caused biggest jump in death rate. Explosions killed 66 men last year as against 9 in 1956.

Ebasco engineers wrap up a fast power plant

Hydroelectric plant engineered and construction-supervised by Ebasco Services Inc. turned out its first commercial kilowatt just 20 months and 2 days after construction contract was signed in mid-1956.

Plant was built for General Electric Co.'s Pelton project on the Deschutes River in central Oregon.

No. 1 generating unit went on the line early this year. Two more 40,000-kw units will go on shortly.

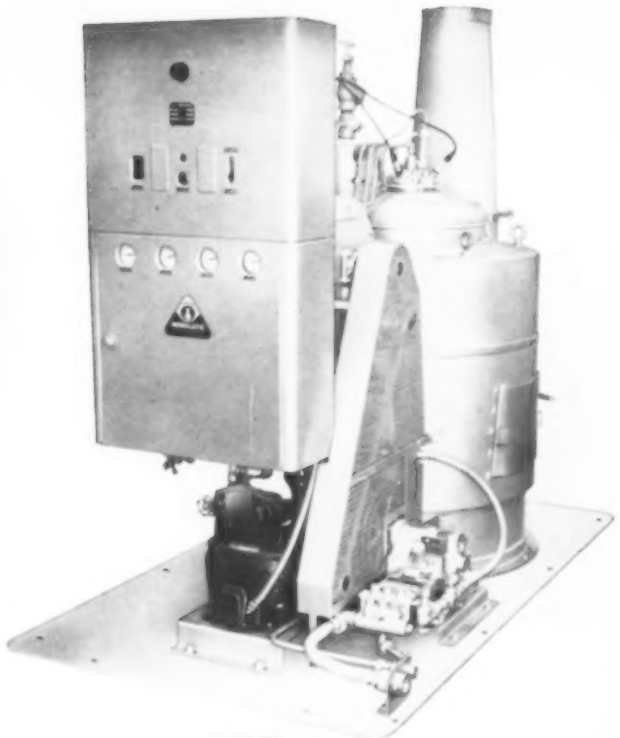
TV beam hops 185 miles between Miami, Havana

Tropospheric scatter links, 6 to 12 miles high, carry television signals from Florida City, on Florida's southern tip, to Cuba. This is first use of "over-the-horizon" tropospheric propagation for television transmission. Technique indicates good results when television signal has to be transmitted over mountainous terrain. ◆

over 13,000 Modulātics in use today prove they

Save

• SPACE
• FUEL
• LABOR



Modulātic needs no enclosure, special foundation, expensive stack. It's shipped fully assembled—just connect and fire up. Base plate, upon which the 60-h.p. unit shown at right is delivered, measures only 4' x 7'.

MODULĀTIC

...world's most compact water tube boiler

Takes No More Space Than A Desk and Chair! This pocket-size power package does a "big-boiler" job to solve your steam problems. Compact, complete, it fits anywhere . . . in unused corners, aisles, balconies . . . to provide all the steam you need, where you need it, when you want it. Fully automatic, push-button operation —set controls for pressure desired . . . Modulātic does the rest. Saves fuel—steam produced only "on demand". Clean, quiet operation . . . practically no maintenance. And for large steam requirements, multiple installations provide same steam capacity, in far less space, than conventional boilers. Single, coordinated control cuts individual units in and out to meet changing steam demands . . . far more economically and efficiently than idling larger boilers.

Sizes range from 10 to 160 h.p.; pressures from 5 to 300 p.s.i. and much more, if required. Maximum floor load, only 150 lbs./sq. ft. Choice of oil, gas, or combination burner. Steam from cold starts in 2 minutes ends early reporting and standby.

Ask for free 12-page Modulātic Bulletin No. 586

VAPOR HEATING CORPORATION

80 East Jackson Boulevard • Chicago 4, Illinois
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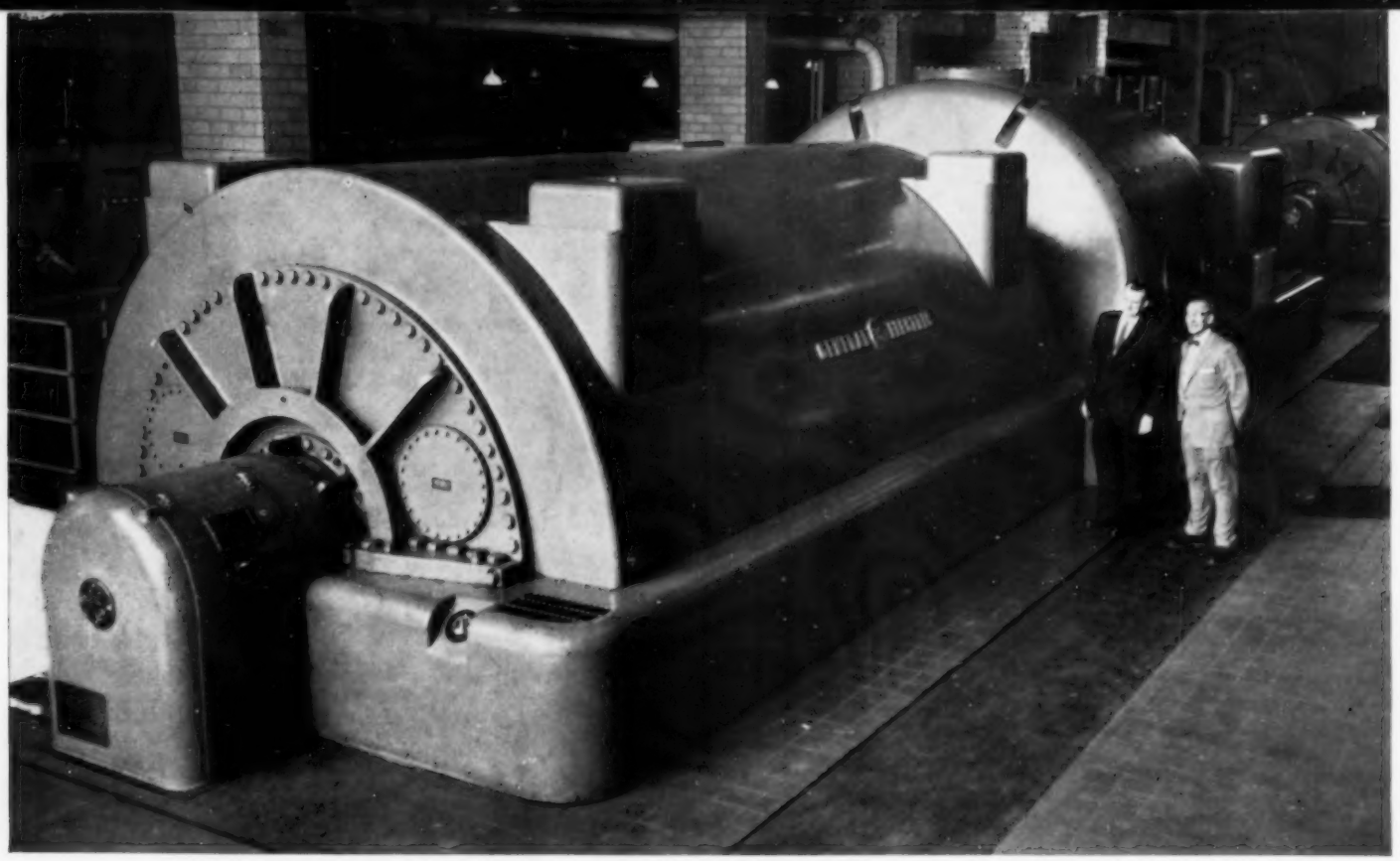

This new 70,000 kw reheat turbine—like all other turbines in this plant—is 100% Texaco-lubricated to keep it free from rust, sludge and foam.

A large Eastern Utility found:

Texaco gives these 3 big benefits for complete turbine protection:

1. Unquestionable dependability. Texaco Regal Oil R&O keeps the utility's turbine system clean; prevents rust, sludge and foam from forming; keeps bearing temperature normal and governor response instantaneous. Texaco dependability is a *fact* for this utility, based on long experience.

2. High efficiency. Texaco Regal Oil R&O assures smooth performance and freedom from unscheduled outages. Texaco Regal Oil R&O gives bearings full protection throughout an extra-long oil service life.

3. Technical service. Texaco offers this important benefit at a time when power demands are almost out-growing turbine production. Past experience in the power plants has proved Texaco Lubrication Engineering Service to be quick and reliable. This service is always available to Texaco customers—whatever the need.

There is a complete line of Texaco Regal Oils R&O to meet the requirements of all leading turbine manufacturers, regardless of turbine type or size. Let a Texaco lubrication expert help you select the Texaco Regal Oil R&O that will keep turbine efficiency high and maintenance costs at a minimum. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States—or write:

The Texas Company, 135 East 42nd Street, New York 17, New York.

LUBRICATION IS A MAJOR FACTOR IN COST CONTROL

(PARTS, INVENTORY, PRODUCTION, DOWNTIME, MAINTENANCE)

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